Assessing Compulsivity with the Personality Psychopathology Five and the Five Factor Model

A dissertation submitted to Kent State University in partial fulfillment of the requirements for the degree of Doctor of Philosophy

by

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December 2012
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Acknowledgements

I wish to thank Jack Graham for his constructive feedback and patient mentorship not only on this project but throughout my doctoral training. I also want to thank Lesley Hiebing, Will Ajayi, Nycole Cox, Michael Factor, and anyone else who helped with assembling data collection packets, collecting data, and cleaning data prior to entry. I would like to thank my parents who always encouraged and supported me in my educational endeavors. Finally, I would like to thank Christa Veltri for her consistent and tireless support. I sincerely doubt I would have ever achieved this goal without her.
Summary

Compulsivity is a personality domain trait that the DSM-5 Work Group on Personality and Personality Disorders (Work Group) defined as “The tendency to think and act according to a narrowly defined and unchanging ideal, and the expectation that this ideal should be adhered to by everyone” (APA, 2010). The Work Group suggested compulsivity was comprised of five facet traits: perfectionism, perseveration, rigidity, orderliness, and risk aversion. The purpose of this study was to examine to what degree the personality domain trait of compulsivity and its associated facet traits were encompassed by two existing models of personality, namely the Personality Psychopathology Five (PSY-5) and the Five Factor Model (FFM). Self-report questionnaires designed to measure the PSY-5 and FFM as well as the facet traits of compulsivity were administered to a total of 664 undergraduates at a large midwestern university. The responses of 408 students were examined using both multivariate and univariate analyses. The results of the study did not support the theory that perfectionism, orderliness, perseveration, rigidity, and risk aversion were all facets of a single broad domain trait of personality. However, there was evidence these facet traits were accounted for with varying degrees of success by the PSY-5 and FFM. For example, the PSY-5 was better able than the FFM to account for risk aversion while the opposite was true for orderliness. Further research into the domain and facet traits of maladaptive personality will be needed with the implementation of a dimensional model for the assessment of personality disorders in DSM-5. This area of research has the potential to
advance not only the understanding of the structure and treatment of personality pathology, but it may also eventually influence the broader conceptualization and organization of all psychopathology as well as provide a stronger understanding of etiological factors and targets for intervention.
Introduction

Clinicians and researchers alike have long been fascinated by personality disorders. However, there are some contentious issues regarding personality disorders that have not yet been resolved in the empirical literature (Fowler, O’Donohue, & Lilienfeld, 2007). One of these controversies revolves around the utility of a categorical versus a dimensional approach for diagnosing personality disorders (Fowler et al.). A basic criticism of the categorical approach to diagnosing personality disorders is that the disorders identified in the DSM-IV-TR (American Psychiatric Association, 2000) are both heterogeneous and overlapping, contributing to unusually high rates of co-morbidity (Trull & Durrett, 2005). Trull and Durrett review several strategies for making personality disorder diagnosis dimensional, including simply quantifying the current categorical system (i.e. using symptom counts) and providing ratings of congruence to a prototypical personality disorder. Ultimately, they conclude that the most fruitful approach might be to focus on assessing underlying dimensions of personality that at certain extremes or in particular combinations would result in the patterns of maladaptive thoughts, emotions, behaviors, and relationships that characterize personality disorders.

Research efforts aimed at examining the diagnostic utility of dimensional models have become plentiful in the literature and several models or methods for implementing a dimensional system have been proposed (for a review, see Widiger & Simonsen, 2005). Members of the DSM-5 Personality and Personality Disorders Work Group (Work Group) undertook the task of considering implementation of a dimensional model of
personality for inclusion in the DSM-5. Their efforts began with the considerable task of sifting through the literature to identify important personality traits and then rationally sort them into domains (Krueger, Derringer, Markon, Watson, & Skodol, 2010). When the proposed changes for the DSM-5 were made available on the internet it became public knowledge that the Work Group had suggested implementing a dimensional system comprised of six personality trait domains and thirty-seven associated facet traits (APA, 2010). The trait domains identified by the Work Group were named negative emotionality, introversion, antagonism, disinhibition, compulsivity, and schizotypy (APA, 2010). Each of these domains can be identified as an important underlying personality dimension connected with at least one DSM-IV personality disorder.

**Compulsivity**

The compulsivity domain is most directly connected to Obsessive-Compulsive Personality Disorder (OCPD) of all the Axis I and Axis II disorders found in the DSM-IV. However, compulsivity has been of interest to psychiatrists and psychologists since long before the publication of the first DSM. Eisen, Mancebo, Chiappone, Pinto, and Rasmussen (2008) traced the origin of interest in compulsive personality back to French psychologist Pierre Janet who wrote shortly after the turn of the 20th century of a “psychasthenic state” that shared an important characteristic in common with modern conceptualizations of OCPD. Eisen et al. explained that Janet believed that compulsive personality was characterized by a “need for perfection” (p. 317) and that individuals with a compulsive personality were constantly frustrated and dissatisfied by their own sense of imperfection.
Since Janet, many psychologists and psychiatrists from a variety of theoretical backgrounds have examined and theorized about compulsivity. Psychoanalysts, beginning with Sigmund Freud have written extensively about the subject. Freud (1908/1959) wrote of the anal character which he described as being marked by orderliness, parsimoniousness, and obstinacy. He believed that the anal character was a result of inadequate resolution of the anal phase of psychosexual development and caused the development of an overly strong superego. Vaughan and Salzman (1996) explained that over the years psychodynamic theorists have generally abandoned Freud’s belief that OCPD is a result of anal fixation and have instead emphasized the role of authoritarian parenting. They added that there is a basic understanding that OCPD “results from the typical ego defensive strategies of isolation of affect, undoing, overvaluation of thought, and reaction formation” (p. 184). However, Vaughan and Salzman reported that psychoanalysts have failed to agree upon a single key aspect of compulsive personality and instead have emphasized a number of different characteristics such as control, “the importance of power struggles and excessive rage” (p. 184), response to authority, and failure to live up to excessive expectations of the self.

Interpersonal theorists have also tended to emphasize the role of parenting in the development of compulsive personality traits. For example, Harry Stack Sullivan (1953) suggested that compulsivity results from growing up in a home environment where superficial expressions of love and warmth mask an undercurrent of anger and hatred. He suggested that children growing up in this environment never develop good interpersonal skills and rely on a life of rule following in order to feel good about themselves and gain
a sense of control over their lives. Benjamin (1996) argued that children develop compulsive personality traits as an attempt to identify with and cope with parents who are callous, controlling, demanding, and quick to punish for rule breaking but slow to praise success.

Franklin, Piacentini, and D’Olio (2007) gave voice to a developmental perspective on compulsivity that emphasized the importance of maladaptive perfectionism during childhood and adolescence in the ultimate development of OCPD. Alfred Adler (1956) described maladaptive perfectionism as being marked by orderliness, unrealistic goal-setting, and overemphasis on avoiding errors. Adler also explained that maladaptive perfectionists strive for goals that were unachievable while adaptive perfectionists set and achieve attainable goals. Rice and Preusser (2002) investigated empirically the factors associated with perfectionism in children. They found that perfectionism was characterized by avoidance of errors, orderliness, a sense of self-worth based upon perfect behavior, and seeking recognition from others. Rice and Preusser go on to suggest that each of these facets of perfectionism can be adaptive or maladaptive depending upon the degree and manner to which they are present. Franklin et al. claim that during development both internal and external pressures exist for the perfectionist to achieve, and often adults may unwittingly reinforce maladaptive perfectionistic tendencies because they are seen as positive. Thus, over time the perfectionistic tendencies of a maladaptive perfectionist continue to grow until they become excessive and negatively impact his/her life, and unless significant changes are made OCPD develops (Franklin et al.).
Beck, Freeman, Davis, and associates (2004) carefully examined the thought processes associated with compulsivity as they developed a cognitive model for OCPD. They suggested that OCPD was the result of underlying maladaptive schemas like “I must avoid mistakes at all costs” and “There is one right path/answer/behavior in each situation” (p. 328). Beck et al. further explained that cognitive errors like dichotomous thinking contributed to the development of specific aspects of OCPD such as rigidity and perfectionism. Other examples of maladaptive cognitions include magnification and catastrophizing resulting in the development of overemphasis on the importance of perfectionism and the overestimation of the negative consequences associated with mistakes and errors (Beck et al., 2004).

Finally, existing dimensional models of personality have also been applied to understanding OCPD. For example, it has been suggested that compulsivity can be viewed as excessive conscientiousness if one wants to utilize the Five Factor Model (Samuel & Widiger, 2010). Another example would be Cloninger’s model of temperament in which he describes compulsivity as being comprised of “low novelty seeking, high harm avoidance, high persistence, and, rarely, high reward dependence” (1996, p. 61).

Despite the various emphases psychologists have placed on different phenomenology and etiology of compulsivity over the years, its formal place in the diagnostic nosology has been relatively stable (Eisen et al., 2008). Certainly the name has experienced small changes over the years from compulsive personality (DSM; APA, 1952) to obsessive-compulsive personality (DSM-II; APA, 1968) to compulsive
personality disorder (DSM-III; APA, 1980) to obsessive-compulsive personality disorder (DSM-III-R; APA, 1987) which it remains to this day. There have also been some adjustments to the diagnostic criteria over time. Eisen et al. (2008) point out that two criteria, “(a) restricted expression of affect and (b) indecisiveness” (p. 317) were dropped when DSM-IV (APA, 1994) was released. However, Eisen et al. conclude that OCPD as defined in the DSM “continues to be essentially based on the impairment in functioning due to excessive and chronic perfectionism, work devotion, and rigidity” (p. 317).

In more recent years, compulsivity seems to have been of less interest to psychologists as a personality construct, although facets of it have certainly generated great interest among researchers (e.g. perfectionism). In recent years, there has been a great deal of research and theory generated using the term compulsivity, but referring to compulsive behaviors rather than a personality trait. Compulsive behaviors are a hallmark of obsessive-compulsive disorder (OCD) and are defined by the DSM-IV-TR as “repetitive behaviors…or mental acts…the goal of which is to prevent or reduce anxiety or distress, not provide pleasure or gratification” (APA, 2000, p. 457). Some researchers have proposed that compulsive behavior and impulsive behavior actually anchor two ends of a single dimension of repetitive behaviors and that disorders marked by compulsive and/or impulsive behaviors belong to a distinct diagnostic group of obsessive-compulsive spectrum disorders (OCSDs; Hollander, Friedberg, Wasserman, Yeh, & Iyengar, 2005). However, not everyone is convinced that the wide array of disorders suggested to comprise the OCSDs actually form their own distinct diagnostic category. Abramowitz, Storch, McKay, Taylor, and Asmundson (2009) argue that the
compulsive-impulsive dimension that forms the core of the argument for OCSDs is problematic. Specifically, they believe that this construct focuses on symptom presentation rather than shared etiology resulting in “limited heuristic and practical value when compared to a phenotypic or functional model of diagnostic classification” (Abramowitz et al., 2009, p. 346).

It is important to briefly mention the interest in compulsive behavior because it has resulted in several consequences for compulsive personality. First, there is the confusion that results from using the same term to describe somewhat related, yet distinct psychological constructs. Perhaps because of this similarity in construct names, there has been great interest in examination of any connection between OCD and OCPD. Eisen et al. (2008) reviewed this research and concluded that “the relationship between OCD and OCPD currently remains unclear” (p. 329); however, the DSM-IV-TR specifically states that “the clinical manifestation of these two disorders are quite different. Obsessive-Compulsive Personality Disorder is not characterized by the presence of obsessions or compulsions and instead involves a pervasive pattern of preoccupation with orderliness, perfectionism, and control…” (APA, 2000, p. 462). Finally, OCPD and its associated personality characteristics have sometimes been lumped into consideration as part of the OCSDs (e.g. Skodol & Oldham, 1996) despite the lack of strong empirical support to do so (Vaughan & Salzman, 1996). Let it be clear that in the remainder of this paper the term compulsivity will be used exclusively to refer to the personality domain trait and not to compulsive behavior, OCD, OCSD, or the compulsive-impulsive dimension.
DSM-5 and Personality Disorders

The Personality and Personality Disorders Work Group (Work Group; APA, 2010) of the DSM-5 proposed major changes to the structure of the nosology of personality psychopathology. In general, the Work Group initially recommended that each person be assessed in terms of personality traits and function with a final determination as to whether or not personality pathology is present only to be made as the last step in the evaluation. An evaluation of personality functioning asks clinicians to rate on a five point Likert item whether or not there is impairment in interpersonal functioning or sense of self as a result of personality characteristics.

The Work Group proposed that personality is comprised of two different categories or classes of personality traits (APA, 2010). Domain traits are personality dimensions that provide a broad or wide-angle description of individual personality characteristics. Domain traits are located high on the personality hierarchy and are comprised of a number of subordinate personality constructs that are called facet traits by the members of the Work Group. Facet traits, in turn, are more specific or narrow aspects of personality. These constructs are still broader than a specific behavior, but are more focused than a domain trait. The Work Group proposed that clinicians rate each client on four point Likert-like scales for six personality domain traits (negative emotionality, introversion, disinhibition, antagonism, impulsivity and schizotypy) each of which are comprised of multiple facet traits. For example, the Work Group proposed that the compulsivity domain trait is made up of perfectionism, rigidity, risk aversion, orderliness, and perseverance at the facet level.
Compulsivity Domain Trait

Compulsivity is a personality domain trait that the Work Group defined as “The tendency to think and act according to a narrowly defined and unchanging ideal, and the expectation that this ideal should be adhered to by everyone” (APA, 2010). It is comprised of five facet traits: perfectionism, perseveration, rigidity, orderliness, and risk aversion. Perfectionism is characterized by the Work Group as a preoccupation with flawlessness, detail, and unrealistic standards. Perseveration is marked by a dogged persistence that is unresponsive to natural consequences that indicate that the behavior is no longer necessary or useful. Inflexibility in behavior, routine, thoughts, beliefs, and practices combined with a lack of ability to change despite evidence or circumstance are the hallmarks of high rigidity. A high degree of orderliness is characterized by the Work Group as a “need for order and structure”. Finally, avoiding even minimal risks is the key feature of the risk aversion personality facet.

Krueger et al. (2010) described the process of developing the proposed personality trait model for use in DSM-5 as consisting of two basic steps. First, members of the Work Group “identified and described clinically important facet-level personality constructs” (Krueger et al.). Next, two members of the Work Group sorted these facet traits into overarching personality domain traits utilizing existing models of personality found in the empirical literature as a guide (Krueger et al.). Krueger and Clark, writing on behalf of the Work Group, explain that four of the personality domains (negative emotionality, antagonism, introversion, and disinhibition) are closely related to four of
the five personality traits identified by the Five Factor Model (FFM) of personality (APA, 2010).

Krueger and Clark then identified two empirical studies to support the addition of a compulsivity domain to the Work Group’s proposed dimensional model (APA, 2010). O’Connor (2005) conducted an exploration of the structure of personality disorders by quantitatively examining their consensus factor structure across a number of published data sets. He concluded that OCPD formed a unique dimension onto which no other personality disorder significantly loaded. Saulsman and Page (2004) conducted a meta-analysis of studies comparing the ability of scales assessing the FFM to account for personality disorder pathology. They found that the FFM did tap into OCPD symptoms primarily via scales measuring the conscientiousness personality trait, but based on the effect size they concluded that the FFM did not capture OCPD pathology as adequately as it did for other personality disorders. Thus, the Work Group concluded, based on these studies, that a personality trait at the domain level which was distinct from the FFM was needed to adequately tap into an important aspect of personality disorders. Therefore, they added compulsivity to their proposed model (APA, 2010).

**Five Factor Model**

The FFM is a model of “normal” personality that was developed over several decades by numerous researchers examining portions of the English lexicon (John, Naumann, & Soto, 2008). The strategy of examining these words was based on the lexical hypothesis which stated that important individual differences should be incorporated into the natural language. Words deemed to be descriptive of personality
characteristics were submitted to factor analysis and, ultimately, multiple researchers came to the conclusion that five broad personality dimensions were consistently replicable. The most commonly used names for these dimensions are extraversion, neuroticism, agreeableness, conscientiousness, and openness.

Costa and McCrae (1992) describe Neuroticism as a personality trait that contrasts emotional stability on one end with susceptibility to and experience of negative affect (e.g. fear, anxiety, sadness) on the other. Extraverts are characterized by a strong preference for others, high energy and active lifestyle, a talkative nature, assertiveness, optimism, cheerfulness, and a preference for excitement and stimulation (Costa & McCrae). In contrast, Costa and McCrae explain that introverts are reserved, independent, shy, and may have a more constrained experience of positive emotions. They state that openness taps into imagination, curiosity, independent thinking, aesthetic sensitivity, and desire for variety. Costa and McCrae explain that

Open individuals are curious about both inner and outer worlds, and their lives are experientially richer. They are willing to entertain novel ideas and unconventional values, and they experience both positive and negative emotions more keenly than do closed individuals. (1992, pp. 15)

Agreeableness is a primarily interpersonal dimension that includes trust, sympathy towards others, modesty, and altruistic tendencies (Costa & McCrae). Finally, they describe conscientiousness as a construct that taps into self-control in terms of task completion, achievement orientation, scrupulousness, orderliness, and self-confidence.
Given the importance that the FFM played in the development of the Work Group’s proposed dimensional model of personality (APA, 2010; Krueger et al., 2010), it seems relevant to briefly review the ability of the FFM to measure compulsivity. Unfortunately, because of the recent release of the proposed dimensional model for DSM-5 there are no published studies that directly compare the ability of the FFM to measure compulsivity as it is specifically defined by the Work Group. Thus, research comparing the FFM’s ability to measure DSM-IV-TR’s OCPD might provide the best evidence available at this time.

As mentioned previously, a meta-analysis by Saulsman and Page (2004) concluded that the FFM did not account for OCPD symptoms as well as it did for the symptomatology of other forms of personality disorder. Samuel and Widiger (2008) conducted another meta-analysis of the FFM and personality disorders. Their meta-analysis had only one sample that overlapped with the Saulsman and Page (2004) meta-analysis, but similar results were obtained. Again the FFM, primarily via the conscientiousness domain, demonstrated relatively small effect sizes in accounting for OCPD psychopathology in comparison to the FFM’s ability to capture other personality disorders (Samuel & Widiger, 2008). Samuel and Widiger (2010) wrote that “a preoccupation with orderliness and perfectionism are two of the three defining features of DSM-IV-TR OCPD (American Psychiatric Association, 2000, p. 725)” (p. 238) when they stated that conscientiousness of the FFM should account for a good portion of OCPD symptomatology. This expectation would also seem to link conscientiousness to that aspect of OCPD encapsulated by the Work Group’s (APA, 2010) proposed definition
of compulsivity. Thus, special attention should be paid to the relationship between conscientiousness and OCPD pathology when attempting to discern the relationship between the FFM and compulsivity.

Samuel and Widiger (2010) examined different measures of OCPD and concluded that some are better at tapping into the full range of OCPD criteria while others emphasized only certain types of symptoms. However, Samuel and Widiger (2010) found that neuroticism was generally more strongly related to OCPD than conscientiousness even using the dependent measures they recommended as having better content validity. Bagby, Sellbom, Costa, and Widiger (2008) found that an inverse relationship with agreeableness was the only significant correlation between the FFM and symptoms of OCPD when using one of the measures recommended by Samuel and Widiger (2010) as the dependent variable. Nestadt et al. (2008) conducted a factor analysis of a semi-structured diagnostic interview that measured DSM-IV personality disorder symptoms. They named one factor compulsive and concluded that it “shows little or no association with any [FFM] domains” (Nestadt et al., 2008, p. 100). McNulty, Ben-Porath, and Watt (1997) found that the only significant relationship between the FFM and OCPD symptomatology was a positive correlation with neuroticism. Taken in sum, the evidence supporting the ability of the FFM conscientiousness domain to adequately account for OCPD symptomatology is marginal at best.

Haigler and Widiger (2001) reached a similar conclusion when they reviewed the empirical literature. They suggested that the items that comprise the conscientiousness scale primarily measured adaptive instead of pathological levels of conscientiousness and
offered this as an explanation for its poor ability to account for OCPD symptomatology. Haigler and Widiger empirically tested this hypothesis by modifying items on the NEO-PI-R (Costa & McCrae, 1992) such that those items that were deemed to measure adaptive levels of conscientiousness were reworded to tap into maladaptive levels of conscientiousness and vice versa. For example, “I adhere strictly to my ethical principles” was changed to “My adherence to moral and ethical principles is described sometimes as extreme” (Haigler & Widiger, p. 347). Haigler and Widiger found that the correlations of conscientiousness with measures of OCPD symptoms dramatically increased when using their modified version of the NEO-PI-R as compared to the published version.

Stumpf and Parker (2000) examined the relationships between the FFM and perfectionism, a trait that has been proposed by the Work Group (2010) as a facet of compulsivity. Stumpf and Parker used the Multidimensional Perfectionism Scale (MPS; Frost, Marten, Lahart, & Rosenblate, 1990) as their measure of perfectionism. Although they did not report the correlations between the FFM and the overall perfectionism score of the MPS, they did identify some interesting relationships with the MPS’s subscales. Stumpf and Parker report that neuroticism was positively correlated with the Concern over Mistakes and Doubts about Actions subscales, which they refer to as markers of unhealthy perfectionism. Conscientiousness was not significantly related to those subscales, but was significantly correlated with the Personal Standards and Organization subscales, which Stumpf and Parker identify as markers of healthy perfectionism. It should also be noted that the Organization subscale of the MPS is sufficiently distinct
from the other subscales that it is not used to calculate the overall perfectionism score (Frost et al) and is likely a better marker of the orderliness facet trait of compulsivity.

There has also been a study examining the relationship between the orderliness facet trait of compulsivity and the FFM. As part of their initial development and reporting of the psychometric properties of the Disinhibition Inventory (DIS-I), Dindo, McDade-Montez, Sharma, Watson, and Clark (2009) examined the relationship between the Orderliness subscale of the DIS-I and the FFM. They reported a significant, positive correlation between Orderliness and Conscientiousness. The Orderliness subscale was not significantly correlated with any other FFM subscales.

There are no published studies that directly examine the relationship between the FFM and the risk aversion facet trait of compulsivity as it is defined by the Work Group. There are a number of studies that examine the FFM and various forms of risk taking. The results of these studies are somewhat inconsistent and perhaps vary based on the type of risk taking being assessed (e.g. risky sexual behavior vs. speeding) or the population from which the participants were drawn (e.g. adolescents vs. college fraternity/sorority members). However, perhaps the most commonly identified relationship was a negative correlation between conscientiousness and risk taking behaviors (Dindo et al., 2009; Gullone & Moore, 2000; Gute & Eshbaugh, 2008; Hong & Paunonen, 2009; Nicholson, Soane, Fenton-O’Creery, & Willman, 2005; Trobst, Herbst, Masters, & Costa, 2002).

**Personality Psychopathology Five**

Based on the results of Haigler and Widieger’s (2001) experiment, it seems possible that a model of personality designed specifically to capture both normal and
abnormal personality traits might be better able to tap into the Work Group’s (APA, 2010) proposed compulsivity trait domain. The Personality Psychopathology Five (PSY-5; Harkness & McNulty, 1994) is just such a model. The PSY-5 model of personality was developed by examining personality traits derived from the problems attributed to personality disorders in the DSM with the goal of identifying a set of traits that would be useful to both clinicians working with clients suffering from disordered personality and researchers seeking to better understand these same phenomena. The developers of the PSY-5 sought to combine lower order, or narrow-band, personality markers based on their understood semantic relationships to each other into broader, summary traits that could be used to capture the essence of disordered personality.

Harkness and McNulty laid out a brief argument for why they suspected that a model distinct from the FFM might be necessary to capture the full range of personality trait dimensions inherit in personality pathology that was based on both their reading of the empirical literature and a theoretical understanding of personality disorder and its relationship to personality traits. Harkness and McNulty (1994) argued that the FFM might not be the optimal model for disordered personality for several reasons. They questioned whether the five factor solution used by the FFM might be the optimal “slice through the [personality] hierarchy” needed for tapping into personality pathology (Harkness & McNulty, 1994, p. 293). Harkness and McNulty also argued that the boundaries of trait dimensions are set by the population variance from which they are examined. They then raised the question of whether a trait model examined and developed from community samples would encapsulate the wide and often extreme range
of traits found in samples saturated with personality pathology. Specifically, they identified the inability of the FFM to meaningfully capture thought dysfunction as an example of its limitations in examining the full range of personality trait dimensions important to understanding personality disorders.

These concerns left Harkness and McNulty with the challenge, “Which set of psychologically interpretable dimensions maximally spreads out markers of the personality disorders?” (1994, p. 295). They began answering this question by selecting personality markers that would represent the full range of normal and pathological personality dimensions. They did this by compiling descriptors from the DSM-III-R personality disorders for use as the markers of pathological personality (for details on how these variables were selected see Harkness, 1992) and utilizing descriptors from Tellegen’s Multidimensional Personality Questionnaire (Tellegen & Waller, 2008) for the markers of normal personality. Harkness and McNulty ultimately compiled a list of 60 phrases describing personality. These descriptors were then sorted three times by each of 201 participants. For the first sort, participants were instructed to place descriptors with similar meanings into groups and create at least 10 different groups. Next, they asked participants to identify any descriptors that were opposites of each other. Finally, Harkness and McNulty instructed participants to sort the descriptors into less than 10 groups of broadly related descriptors. Harkness and McNulty then constructed a “psychological similarity-distance matrix for each participant” (1994, p. 297) to quantify the distance between each descriptor. They then combined individual participant matrices to form a consensus matrix which was analyzed using latent root method.
Harkness and McNulty (1994) examined the relationships between the descriptors by looking at range of factor solutions from 20 groupings of descriptors to five groupings of descriptors. They found that when grouping the descriptors into 20 groups the groups were more homogenous and narrow and when examining solutions with fewer groups, the clusters of descriptors became broader and were comprised of more heterogeneous descriptors of personality. Most importantly, they found that almost without exception the smaller, narrow groups found in the 20 factor solution combined to form broader, but still related groupings found in the five factor solution. Harkness and McNulty concluded that these results were indicative of a genuine hierarchical relationship structure underlying the 60 personality descriptors that they had identified as important to both normal and pathological personality.

Harkness and McNulty (1994) next examined the full hierarchy of their descriptors to help name and interpret the five broad factors they identified that comprise the PSY-5. The first factor they named Aggressiveness (AGGR) and stated that it is characterized by instrumental, or offensive, aggression along with elements of grandiosity, desire for power, and interpersonal dominance. They named the second factor Psychoticism (PSYC) and described it as the accuracy with which an individual’s inner construction of reality matches that of the external reality. The third factor was initially named Constraint, but was later reversed in direction and labeled Disconstraint (DISC). DISC is comprised of a combination of impulsiveness, risk-taking, rule/norm breaking, and sensation seeking. Negative Emotionality/Neuroticism (NEGE) was identified by Harkness and McNulty as the fourth factor. They explained that this factor
was a combination of negative affective states especially characterized by nervousness and anxiety. The final factor was initially named Positive Emotionality/Extraversion and later reversed and re-named Introversion/Low Positive Emotionality (INTR). They described the fifth factor as being marked by a person’s ability (or inability) to experience positive emotions and his/her tendency to engage in social activities. In other words, this factor in its reversed (and more pathological) direction is characterized by both emotional and social anhedonia.

Again, due to the recent release of the Work Group’s definition of compulsivity as a personality trait domain (APA, 2010), empirical literature directly examining the ability of the PSY-5 to account for compulsivity is unavailable. Instead, studies exploring the ability of the PSY-5 to account for OCPD symptomatology will have to suffice. Theoretically, the element of OCPD related to compulsivity might best be captured by the DISC scale, so special attention will be paid to this trait.

Unfortunately, there are only two studies reported that directly study the ability of the PSY-5 to account for OCPD. Bagby et al. (2008) found that NEGE and AGGR were significantly, positively correlated with OCPD pathology, but DISC was not. McNulty et al. (1997) reported similar results, although this time PSYC was also positively correlated with OCPD symptoms in addition to NEGE and AGGR. The correlation found in both studies between NEGE and OCPD symptoms is consistent with other research indicating that negative emotions are closely connected to OCPD. The correlation between AGGR and OCPD, also reported by both studies, is consistent with some theoretical (e.g. Vaughan & Salzman, 1996) understandings of compulsivity. Most striking, however, is
the absence of a significant relationship between DISC and OCPD in both of these studies. Perhaps this is because DISC’s emphasis on impulsivity, sensation seeking, risk-taking, and rule breaking does not tap into those aspects of compulsivity that are characterized by the DSM-IV definition of OCPD, which seems to focus on perfectionism and orderliness. There is no clear explanation for McNulty et al.’s identification of a significant correlation between PSYC and OCPD, which was not replicated by Bagby et al., nor does this relationship seem to be consistent with any theoretical expectations. Perhaps it was a sample specific result or a statistical artifact.

One study has also directly examined the ability of the PSY-5 to tap into a compulsivity facet, namely perfectionism. Rice and Stuart (2010) investigated the ability of the PSY-5 to capture perfectionism as measured by the revised Almost Perfect Scale (APS-R; Slaney, Rice, Mobley, Trippi, & Ashby, 2001). Rice and Stuart reported a moderate, inverse correlation between an APS-R subscale measuring self-set standards for performance and INTR as well as a small, but statistically significant inverse correlation between the same APS-R subscale and DISC. Rice and Stuart also found that NEGE and INTR were both significantly correlated with an APS-R subscale tapping into an individual’s perception of the difference between their own standards for performance and how they evaluate their actual performance. Finally, they reported that individuals identified by the APS-R as perfectionists had significantly lower mean scale scores on DISC compared to those identified as non-perfectionists. Individuals identified as adaptive perfectionists had lower INTR and NEGE mean scores than those identified as
maladaptive perfectionists or non-perfectionists. Non-perfectionists also had lower mean scores on NEGE than maladaptive perfectionists.

Other inferences about the association between the PSY-5 and compulsivity (and its facets) can be made from examining reported empirical correlates. For example, multiple sources have established the relationship between DISC and risk taking behaviors (Petroskey, Ben-Porath, & Stafford, 2003; Tellegen & Ben-Porath, 2008; Veltri et al., 2009) and attitudes (Veltri, Graham, Sellbom, & Ben-Porath, 2007). Research has also demonstrated a positive correlation between DISC and self-report measures of impulsivity in medical, mental health, and substance abuse samples (Tellegen & Ben-Porath, 2008). Finally, empirical studies comparing the Multidimensional Personality Questionnaire (MPQ; Tellegen & Waller, 2008) with the PSY-5 have identified an inverse correlation between DISC and constraint, control, harm avoidance, and traditionalism (Harkness, McNulty, & Ben-Porath, 1995; Tellegen & Ben-Porath, 2008). However, empirical data indicate that there was no significant relationship found between DISC (or any other PSY-5 scale) and clinician ratings of being rigid, moralistic, overcontrolled, perfectionistic, idealistic, or dogmatic (Tellegen & Ben-Porath, 2008).

**Present Study**

In summary, the compulsivity personality domain as recently defined by the Personality and Personality Disorders Work Group was proposed for inclusion in the DSM-5 (APA, 2010). Although there is no evidence available that directly examines how this construct relates to current models of personality, there are empirical data indicating that maladaptive compulsivity as defined by the Work Group is perhaps underrepresented
in current models of personality. However, there is also some indication that explicit efforts to measure maladaptive personality traits as opposed to adaptive traits might be better able to capture compulsivity. The purpose of this study was to examine the ability of the PSY-5 model of personality to capture the compulsivity domain and its associated facet traits, and to make a comparison with the ability of the FFM of personality to tap into the compulsivity domain.

**Facet level hypotheses.** Several hypotheses were made regarding the relationships between the scales of the PSY-5 and the scales measuring the facet traits of compulsivity based on theory and the existing empirical literature (see Table 1). It was hypothesized that DISC would be most strongly associated with the risk aversion facet and would have weaker but still significant associations with the rigidity and perfectionism facet traits (all relationships were expected to be inverse). It was hypothesized that NEGE would be significantly correlated with perfectionism. It was hypothesized that AGGR, PSYC, and INTR would not be significantly related to any of the compulsivity facet traits.

Hypotheses regarding the association between the FFM and compulsivity facet traits were also generated based on theory and prior empirical research (see Table 1). It was predicted that Conscientiousness would have a significant, positive relationship with perfectionism, orderliness, and risk aversion. It was hypothesized that Neuroticism would also be significantly associated with perfectionism. It was predicted that Extraversion would have a significant, negative relationship with risk aversion. It was hypothesized that Openness would have a significant, negative relationship with rigidity. No significant
correlations were expected to be found between Agreeableness and any of the compulsivity facet traits.
Table 1

<table>
<thead>
<tr>
<th>Domain Trait</th>
<th>Compulsivity</th>
<th>Criterion Measures</th>
<th>Hypothesized Relationships</th>
<th>Hypothesized Relationships</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facet Traits</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Primary Latent</td>
<td>DISC (-)  C</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(secondary latent)</td>
<td>NEGE, INTR  N</td>
</tr>
<tr>
<td>Perfectionism</td>
<td>MPS</td>
<td></td>
<td>DISC (-), NEGE</td>
<td>C, N</td>
</tr>
<tr>
<td>Perseveration</td>
<td>PDQ</td>
<td></td>
<td>No hypotheses</td>
<td>No hypotheses</td>
</tr>
<tr>
<td>Rigidity</td>
<td>RAPH</td>
<td></td>
<td>DISC (-)</td>
<td>O (-)</td>
</tr>
<tr>
<td>Orderliness</td>
<td>DIS-I Orderliness</td>
<td>No hypotheses</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>Risk Aversion</td>
<td>RPS</td>
<td></td>
<td>DISC (-)</td>
<td>C, E (-)</td>
</tr>
</tbody>
</table>

*Note.* PSY-5 = Personality Psychopathology Five; DISC = Disconstraint; NEGE = Negative Emotionality/Neuroticism; INTR = Introversion/Low Positive Emotionality; FFM = Five Factor Model; C = Conscientiousness; N = Neuroticism; O = Openness to Experience; E = Extraversion; MPS = Multidimensional Perfectionism Scale; PDQ = Perseverative Disposition Questionnaire; RAPH = Rigid Attitudes regarding Personal Habits; DIS-I Orderliness = Disinhibition Invention, Orderliness subscale; RPS = Risk Propensity Scale.
Domain level hypotheses. In terms of the construct of compulsivity itself, it was hypothesized that analyses would demonstrate that compulsivity forms a unitary, higher-order construct comprised of the perfectionism, perseveration, rigidity, risk aversion, and orderliness facet traits. It was also hypothesized that a secondary relationship between some of the facet traits would account for a significant amount of the residual variance after the identification of the primary construct. Thus, the first hypothesized construct was predicted to capture the variance associated with the Work Group’s (APA, 2010) definition of compulsivity as “the tendency to think and act according to a narrowly defined and unchanging ideal, and the expectation that this ideal should be adhered to by everyone.” The secondary hypothesized construct was predicted to capture variance associated with the affective experience that results from compulsive personality.

Hypotheses regarding the relationship of compulsivity with the PSY-5 and FFM were generated based on theory, with the caveat that these hypotheses were based on the condition that compulsivity is structured in a manner that is largely similar to what is hypothesized in the preceding paragraph. If compulsivity does not resemble the structure hypothesized above, then the hypotheses regarding its relationship with the PSY-5 and FFM would no longer make sense. In terms of the relationship between the PSY-5 and the compulsivity domain trait, it was hypothesized DISC would be significantly and negatively related to the primary compulsivity function that represents compulsivity as defined by the Work Group. It was hypothesized that NEGE and, to a lesser extent, INTR would be positively associated with any secondary affective aspects of compulsivity that were identified. Regarding the relationship between the FFM and compulsivity, it was
hypothesized that Conscientiousness would be a significant predictor of the primary compulsivity construct while Neuroticism would be the strongest predictor of the secondary affective component of compulsivity. Finally, it was hypothesized that the PSY-5 would be better able to tap into compulsivity than the FFM because of its ability to measure both adaptive and maladaptive aspects of personality.
Method

Participants

The study sample was comprised of 664 undergraduates recruited from a large midwestern university. All participants received course credit in exchange for their participation. A college student sample was deemed appropriate for this study despite the clear interest in personality psychopathology for two reasons. First, the focus of the study is not on examining a solely clinical phenomenon, which is to say that the ability of the PSY-5 and FFM scales to measure the personality facets associated with compulsivity does not require or rely upon maladaptive levels of those traits to be present. Second, all of the personality traits of interest in this study are dimensional in nature and exist along a spectrum that theoretically includes both maladaptive and adaptive manifestations. Thus, these traits should be found in any college student sample containing adequate response variability.

In order to be included in the study, participants had to answer at least 90% of items on the ten scales measuring the PSY-5 as well as every question on scales measuring the FFM and the facet traits of compulsivity. A total of 82 participants were withheld from analyses as a result of missing data. An additional 174 participants were removed from the sample because of evidence of response bias on the MMPI-2 and/or MMPI-2-RF as evidenced by T scores on VRIN > 79 or TRIN > 79 or F > 79 or Fb > 89 or P > 99 or L > 79 or K > 64 or VRIN-r > 79 or TRIN-r > 79 or F-r > 99 or F-r-r > 79 or F-s > 79 or FBS-r > 79 or L-r > 79 or K-r > 69. Following these screening procedures, the
final sample consisted of 157 men and 251 women with a mean age of 19.79 (SD = 2.54). Racial and/or ethnic self-identification of participants in the final sample was 83.3% white and 9.8% African American with all other ethnic and/or racial identities comprising a total of 6.9% of the sample. Participants excluded from the study were not significantly different from those included in the study in terms of ethnicity ($\chi^2(6) = 3.52, p = .741$), age ($t(658) = 1.93, p = .054$), or gender ($\chi^2(1) = 2.76, p = .097$).

**Procedures**

All participants were administered the MMPI-2, the scales measuring the FFM, and the criterion measures in a single session under standard instructions. Participants completed the computerized administration of the MMPI-2, which previous research has shown to be equivalent to the paper and pencil administration of the inventory (Finger & Ones, 1999). The computerized administration of the MMPI-2 was used to score both the MMPI-2 and the MMPI-2-RF. Previous research has indicated that the MMPI-2-RF can be validly scored using item responses collected from administration of the MMPI-2 (Tellegen & Ben-Porath, 2008; van der Heijden, Egger, & Derksen, 2010). Participants completed all other measures using paper and pencil administration formats. Order of administration of FFM scales and the compulsivity facet trait scales was counterbalanced. The administration of the MMPI-2 and the paper and pencil questionnaires was alternated such that approximately half of all participants completed the MMPI-2 first and then completed the paper and pencil questionnaires while the opposite was true for the other half of the participants.
Instruments

**MMPI-2/MMPI-2-RF.** The Minnesota Multiphasic Personality Inventory – 2 (MMPI-2; Butcher et al., 2001) is a multi-scale inventory designed to assess personality and psychopathology. It is comprised of 567 true-false questions from which many scales, including five designed to measure the PSY-5 model of personality, can be scored.

Harkness, McNulty, and Ben-Porath (1995) constructed scales measuring the PSY-5 constructs for the MMPI-2 using its existing item pool. They used a replicated rational selection process whereby laypersons were provided instruction on the PSY-5 traits and were then asked to select items from the MMPI-2 item pool that were associated with those traits. Items were initially assigned by Harkness et al. to scales only if a majority of laypersons agreed in assigning the item. Scales were further refined by the authors who deleted items that they believed did not accurately reflect the PSY-5 construct to which they had been assigned. Finally, Harkness et al. removed some items from scales based on preliminary psychometric data from three distinct samples when these results indicated poor scale fidelity (i.e. cross-scale correlations and/or poor item-scale correlations).

Harkness et al. reported reliability estimates for the PSY-5 scales across multiple samples with alphas ranging from .65 to .88. It should be noted that the internal consistency for each of the PSY-5 scales was consistently higher in the psychiatric and substance abuse samples than in the college student and normative samples. Descriptive statistics and estimates of internal consistency for the PSY-5 scales in this study are reported in Table 2. Cronbach’s α values were acceptable and consistent with previous
research, ranging from .67 to .82 with the exception of PSYC ($\alpha = .59$). PSYC also demonstrated significant restriction of range in this sample.

The Minnesota Multiphasic Personality Inventory – 2 – Restructured Form (MMPI-2-RF; Ben-Porath & Tellegen, 2008) is a multi-scale instrument designed to assess personality and psychopathology. The MMPI-2-RF is comprised of a 338 item subset of MMPI-2 items that can be used to score 51 different scales. Constructs assessed by the MMPI-2-RF range from the very broad (e.g. externalizing behaviors) to the very narrow (e.g. juvenile conduct problems). Tellegen and Ben-Porath (2008) explained that with the construction of the MMPI-2-RF they asked the original developers of the PSY-5, Harkness and McNulty, to reconstruct PSY-5 scales for the MMPI-2-RF.

Harkness and McNulty (2007) relied on internal and external psychometric properties to select items from the existing MMPI-2-RF item pool with their starting place being the items that remained from the original MMPI-2 PSY-5 scales. Tellegen and Ben-Porath report internal consistencies in seven samples for the MMPI-2-RF PSY-5 scales with alphas ranging from .69 to .88. Estimates of test-retest reliability are also provided and range from .76 to .93. Internal consistency coefficients for the PSY-5-r scales were similar in this sample, with Cronbach’s $\alpha$ values mostly ranging from .70 to .80 (see Table 2). Again, PSYC-r was an exception with much lower estimates of internal consistency, $\alpha = .51$. PSYC-r demonstrated even more significant restriction of range in this sample than was observed for PSYC.
Table 2

*Descriptive Statistics and Estimates of Internal Consistency for Scales Examined in this Sample.*

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Scale</th>
<th>Possible Range</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Cronbach’s α</th>
</tr>
</thead>
<tbody>
<tr>
<td>MMPI-2</td>
<td>AGGR</td>
<td>0-18</td>
<td>8.15</td>
<td>3.02</td>
<td>.67</td>
</tr>
<tr>
<td>PSYC</td>
<td></td>
<td>0-25</td>
<td>4.66</td>
<td>2.52</td>
<td>.59</td>
</tr>
<tr>
<td>DISC</td>
<td></td>
<td>0-29</td>
<td>13.31</td>
<td>4.06</td>
<td>.70</td>
</tr>
<tr>
<td>NEGE</td>
<td></td>
<td>0-33</td>
<td>12.45</td>
<td>5.47</td>
<td>.82</td>
</tr>
<tr>
<td>INTR</td>
<td></td>
<td>0-34</td>
<td>9.23</td>
<td>4.44</td>
<td>.76</td>
</tr>
<tr>
<td>MMPI-2-RF</td>
<td>AGGR-r</td>
<td>0-17</td>
<td>8.82</td>
<td>3.17</td>
<td>.70</td>
</tr>
<tr>
<td>PSYC-r</td>
<td></td>
<td>0-26</td>
<td>2.40</td>
<td>1.94</td>
<td>.51</td>
</tr>
<tr>
<td>DISC-r</td>
<td></td>
<td>0-20</td>
<td>7.52</td>
<td>3.51</td>
<td>.73</td>
</tr>
<tr>
<td>NEGE-r</td>
<td></td>
<td>0-20</td>
<td>7.54</td>
<td>3.76</td>
<td>.75</td>
</tr>
<tr>
<td>INTR-r</td>
<td></td>
<td>0-20</td>
<td>4.02</td>
<td>3.52</td>
<td>.80</td>
</tr>
<tr>
<td>BFI</td>
<td>N</td>
<td>1-5</td>
<td>2.88</td>
<td>.77</td>
<td>.83</td>
</tr>
<tr>
<td>E</td>
<td></td>
<td>1-5</td>
<td>3.50</td>
<td>.76</td>
<td>.84</td>
</tr>
<tr>
<td>O</td>
<td></td>
<td>1-5</td>
<td>3.57</td>
<td>.57</td>
<td>.74</td>
</tr>
<tr>
<td>A</td>
<td></td>
<td>1-5</td>
<td>3.95</td>
<td>.59</td>
<td>.78</td>
</tr>
<tr>
<td>C</td>
<td></td>
<td>1-5</td>
<td>3.62</td>
<td>.57</td>
<td>.74</td>
</tr>
<tr>
<td>MPS</td>
<td>Orderliness</td>
<td>1-5</td>
<td>3.35</td>
<td>.80</td>
<td>.84</td>
</tr>
<tr>
<td>DIS-I</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scale</td>
<td>Alpha</td>
<td>Mean</td>
<td>Standard Deviation</td>
<td>Median</td>
<td></td>
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<tr>
<td>---------</td>
<td>-------</td>
<td>------</td>
<td>--------------------</td>
<td>--------</td>
<td></td>
</tr>
<tr>
<td>RPS</td>
<td>1-9</td>
<td>5.61</td>
<td>1.48</td>
<td>.82</td>
<td></td>
</tr>
<tr>
<td>RAPH</td>
<td>1-7</td>
<td>3.91</td>
<td>.84</td>
<td>.79</td>
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</tr>
<tr>
<td>PDQ</td>
<td>1-7</td>
<td>4.08</td>
<td>.85</td>
<td>.66</td>
<td></td>
</tr>
</tbody>
</table>

*Note. N = 408. MMPI-2 = Minnesota Multiphasic Personality Inventory-2; AGGR = Aggressiveness; PSYC = Psychoticism; DISC = Disconstraint; NEGE = Negative Emotionality/Neuroticism; INTR = Introversion/Low Positive Emotionality; MMPI-2-RF = Minnesota Multiphasic Personality Inventory-2 Restructured Form; AGGR-r = Aggressiveness-Revised; PSYC-r = Psychoticism-Revised; DISC-r = Disconstraint-Revised; NEGE = Negative Emotionality/Neuroticism-Revised; INTR = Introversion/Low Positive Emotionality-Revised; BFI = Big Five Inventory; N = Neuroticism; E = Extraversion; O = Openness; A = Agreeableness; C = Conscientiousness; MPS = Multidimensional Personality Scale; DIS-I = Disinhibition Inventory; RPS = Risk Propensity Scale; RAPH = Rigid Attitudes regarding Personal Habits; PDQ = Perseverative Disposition Questionnaire.*
**BFI.** The Big Five Inventory (BFI; John et al., 2008) is a questionnaire designed to assess the five personality traits of the FFM. The BFI is comprised of 44 statements that participants are instructed to rate in terms of how accurately the statements match their own self-perceptions. Ratings are made in response to five point Likert items with a qualitative descriptor provided for each point (disagree strongly, disagree a little, neither agree nor disagree, agree a little, agree strongly). Each item is written as a phrase designed to complete a sentence that begins with “I see myself as someone who…” Example items include “is depressed, blue,” “has an assertive personality,” and “tends to be lazy.” There are two major advantages to using the BFI instead of the NEO-PI-R (Costa & McCrae, 1992). First, the BFI has been made available free to use by its developers. Second, the BFI has significantly fewer items than the NEO-PI-R (44 versus 240).

Basic psychometric properties of the BFI are strong. The BFI has demonstrated good internal consistency with alphas ranging from .79 to .88 (John et al., 2008). Benet-Martinez and John (1998) reported that temporal stability, as estimated by three month test-retest reliability, is also strong (mean $r = .85$). John et al. (2008) also provided the correlations of the BFI scales with their respective NEO Five Factor Inventory scales (the short version of the NEO-PI-R; Costa & McCrae, 1992) which, after correcting for reliability, ranged from $r = .83$ to $r = .97$ with a mean correlation of $r = .92$. In the present sample, the BFI demonstrated acceptable internal consistency with Cronbach’s $\alpha$ coefficients ranging from .74 to .83 (see Table 2).
MPS. The Multidimensional Perfectionism Scale (MPS; Frost, Marten, Lahart, & Rosenblate, 1990) is a 35 item self-report questionnaire designed to assess perfectionism. Each item is worded as a statement that participants are asked to rate on a five point Likert scale with “strongly disagree” and “strongly agree” serving as the qualitative anchors. The MPS provides an overall Perfectionism score as well as scores for six subscales: Concern Over Mistakes, Personal Standards, Parental Expectations, Parental Criticism, Doubts About Actions, and Organization. Analyses during scale development led the authors to conclude that the items from the Organization subscale should not be scored when calculating the overall Perfectionism score although this subscale remains part of the instrument. The overall Perfectionism score was the only scale utilized in this study.

Frost et al. (1990) presented a series of studies designed to examine the psychometric properties of the MPS. Estimates of internal consistency for the overall Perfectionism scale were reported as $\alpha = .90$ in the scale construction sample and $\alpha = .91$ in an additional sample collected as part of scale development. Frost et al. also presented data supporting convergent validity between the MPS and other measures of perfectionism. Finally, Frost et al. also found that the overall Perfectionism score was correlated with measures of depression and obsessive-compulsive symptoms. The internal consistency for the overall Perfectionism scale was also quite high, $\alpha = .89$, in the present sample.

PDQ. The Perseverative Disposition Questionnaire (PDQ) was developed specifically for use in this study. It is comprised of nine self-report questions that are
designed to assess the aspects of the perseveration personality trait as it was defined by the Work Group (APA, 2010) for proposed inclusion as a facet of compulsivity. The Work Group defined perseveration as “Persistence at tasks long after behavior has ceased to be functional or effective; belief that lack of success is due solely to lack of effort or skill; continuance of the same behavior despite repeated failures.” Several existing measures were considered for use in this study before being ultimately rejected because of concerns about their content validity when items were compared to the Work Group’s definition of perseveration. Specifically, these existing measures seemed to capture adaptive rather than maladaptive aspects of perseverance. Thus, items were generated for the PDQ with the specific purpose of being content valid markers for the maladaptive perseveration facet trait. Each question is a seven point Likert item that is anchored by “not at all like me” at one and “very much like me” at seven. Items can be found in the Appendix.

Examination of the mean and standard deviation reported in Table 2 give no indication of restricted range in participant responses on the PDQ. However, internal consistency was poor, $\alpha = .66$, indicating that strong caution is warranted in interpreting the PDQ.

**RAPH.** The Rigid Attitudes Regarding Personal Habits (RAPH; Meresko, Rubin, Shontz, & Morrow, 1954) is a 20 item scale designed to tap into rigidity primarily as manifested in two content domains, resistance to change and dislike for ambiguity. Each of the 20 questions on the RAPH is composed of a six point Likert item with the qualitative descriptors “completely agree” and “completely disagree” assigned to the
poles. Meresko et al. add that as a means of dealing with missing data, when scoring the RAPH a seventh value is inserted as a midpoint to each item and any questions skipped by participants are assigned this value. Finally, six items that exclusively used the masculine pronoun were modified so that they now use gender neutral language.

Meresko et al. (1954) reported initial psychometric data for the RAPH. Split-half reliability estimates (odd-even) are acceptable ($r = .78$). The authors also reported that each item showed acceptable discriminative power in distinguishing between participants in the highest and lowest quartiles of the RAPH total score. Finally, Meresko et al. provided evidence that the RAPH is strongly correlated ($r = .62$) with a measure of authoritarianism, as they hypothesized, thus providing initial evidence of convergent validity. The RAPH demonstrated adequate reliability in this study (Cronbach’s $\alpha = .79$).

**DIS-I.** The Disinhibition Inventory (DIS-I; Dindo, McDade-Montez, Sharma, Watson, & Clark, 2009) was developed to assess multiple facets of both high and low disinhibition. The DIS-I is comprised of 65 Likert-type items rated on a five point scale with the poles being anchored by “strongly disagree” and “strongly agree.” In addition to providing a total Disinhibition score, the DIS-I has five subscales that measure different aspects of disinhibition: Prosociality, Manipulativeness, Risk Taking, Distractibility, and Orderliness. For the purposes of this study, the Orderliness subscale is the only scale of interest. The Orderliness subscale was designed to measure a facet of low disinhibition characterized by orderly and organized living. Examples of item content include concern with “messiness and clutter” and a tendency to “plan daily activities.”
Psychometric data were reported by Dindo et al. (2009) from both an initial development sample and a cross-validation sample. In both samples, the Orderliness scale demonstrated good internal consistency (α = .83) and average interitem correlations (.35). Factor analysis conducted initially in the first sample and cross-validated in the second sample indicated that all nine items of the Orderliness scale loaded specifically and significantly on that scale. DIS-I intrascale correlations indicate that, as expected, Orderliness has a small to moderate, positive correlation with Prosociality and has very small, but negative correlations with the remaining scales (with the exception of the total score which is a moderate, inverse relationship). Finally, the Orderliness scale exhibited acceptable convergent and discriminant validity, as Dindo et al. reported significant correlations with self-report measures of conscientiousness, order, and self-discipline, but non-significant correlations with scales measuring a variety of different personality traits such as agreeableness, antisocial behavior, mistrust, and dependency. In this sample, the Orderliness subscale again exhibited good internal consistency (α = .84).

**RPS.** The Risk Propensity Scale (RPS; Meertens & Lion, 2008) was developed to measure “the tendency to avoid or take personal risks” (p.1508). Meertens and Lion specifically constructed the instrument with the intention of assessing everyday risk taking tendencies as opposed to engagement in risky behaviors associated with personality characteristics like sensation seeking or disinhibition. The RPS is comprised of seven Likert items with each item being rated from one to nine. Responses are anchored at one with “totally disagree” and at nine with “totally agree” except for item
seven, “I view myself as a…” where the anchors are “risk avoider” and “risk seeker” respectively.

Meertens and Lion (2008) provided estimates of internal consistency from four separate samples that range from $\alpha = .74$ to $\alpha = .80$. They also examined two week test-retest reliability in one of their samples and reported it as $r = .75$. Finally, Meertens and Lion reported evidence of convergent validity as the RPS was found to be significantly correlated with measures of risk taking, sensation seeking, need for cognition, and need for structure in a theoretically consistent manner. The RPS also demonstrated strong reliability in this sample (Cronbach’s $\alpha = .82$). Finally, it should be noted that for the purposes of this study the RPS was scored such that high scores were indicative of risk-avoiding tendencies while low scores were indicative of risk-seeking tendencies.

**Data Analysis**

The hypotheses concerning the relationships between the compulsivity facet scales and the PSY-5/FFM scales were examined using univariate analyses (i.e. zero-order correlations and multiple linear regressions). Univariate statistics were not capable of testing the hypotheses generated about the compulsivity domain because of the multivariate nature of the relationships between the facets traits of compulsivity. Therefore, a multivariate procedure, canonical correlation analysis (CCA), was used to examine the hypotheses regarding the compulsivity domain trait. CCA was selected for this study over other multivariate methods because the multiple canonical functions generated during CCA allow for the identification and examination of different sources of variance shared between the two sets of variables. In this study, the ability to analyze
multiple sources of shared variance between the PSY-5/FFM and compulsivity was important because it was hypothesized that the compulsivity facet traits would not only have shared variance due to the compulsivity domain trait, but also have a secondary source of shared variance from the affective experience that results from having compulsive personality characteristics.
Results

Facet Level Analyses

The facet level hypotheses were tested by examining zero-order correlations as well as multiple linear regressions reported in Tables 3-8. Separate analyses were conducted for males and females. In each table, coefficients to the left of the “slash” (/) symbol indicate the values for the male sample while coefficients to the right of the “slash” (/) symbol indicate the values for the female sample. PSYC and PSYC-r were withheld from all facet and domain analyses because these scales demonstrated poor internal consistency and restriction of range in this sample (see Table 2).

PSY-5. The zero-order correlations between the MMPI-2 PYS-5 scales and the scales measuring the compulsivity facets are found in Table 3. For both the male and female samples, the correlation coefficients were of large effect size for the negative relationship between DISC and risk aversion. The correlation between NEGE and perfectionism as well as the correlation between INTR and risk aversion reached medium effect size; however, this was true only in the male sample. All other correlations were small in magnitude.
Table 3

Zero-Order Correlations between MMPI-2 PSY-5 Scales and Facets of Compulsivity.

<table>
<thead>
<tr>
<th>Scale</th>
<th>MPS</th>
<th>DIS-I Orderliness</th>
<th>RPS</th>
<th>RAPH</th>
<th>PDQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGGR</td>
<td>.04/.09</td>
<td>-.03/.13</td>
<td>-.26/-19</td>
<td>.03/.20</td>
<td>.10/.18</td>
</tr>
<tr>
<td>DISC</td>
<td>-.13/-04</td>
<td>-.08/-08</td>
<td><em><em>-52</em>/-54</em></td>
<td>-.22/-06</td>
<td>-.08/-04</td>
</tr>
<tr>
<td>NEGE</td>
<td><em><em>.41</em>/.26</em></td>
<td>.10/.12</td>
<td>.18/.15</td>
<td>.14/.11</td>
<td>.09/.03</td>
</tr>
<tr>
<td>INTR</td>
<td>.16/-05</td>
<td>.09/-14</td>
<td>*<em>.46</em>/.19</td>
<td>.11/-11</td>
<td>-.16/-21</td>
</tr>
</tbody>
</table>

*Note.* Coefficients before the slash are for males, *n* = 157. Coefficients following the slash are for females, *n* = 251. Coefficients of |.30| or greater are in bold. Coefficients hypothesized to be significant are underlined. MMPI-2 = Minnesota Multiphasic Personality Inventory-2; PSY-5 = Personality Psychopathology Five; RPS = Risk Propensity Scale; RAPH = Rigid Attitudes regarding Personal Habits; PDQ = Perseverative Disposition Questionnaire; AGGR = Aggressiveness; DISC = Disconstraint; NEGE = Negative Emotionality/Neuroticism; INTR = Introversion/Low Positive Emotionality; MPS = Multidimensional Personality Scale; DIS-I = Disinhibition Inventory.

* *p* < .001
Each of the compulsivity facets was then individually regressed onto the MMPI-2 PSY-5 scales using multiple linear regressions. In the male sample, the PSY-5 scales were able to account for statistically significant variance in the scales measuring perfectionism: $R^2 = .179$, $F(4, 152) = 8.31, p < .001$; and risk aversion, $R^2 = .384$, $F(4, 152) = 23.73, p < .001$, but not those measuring orderliness, $R^2 = .015$, $F(4, 152) = .597, p = .665$; rigidity, $R^2 = .078$, $F(4, 152) = 3.20, p = .015$; and perseveration, $R^2 = .067$, $F(4, 152) = 2.70, p = .032$. The results indicated that the PSY-5 scales were able to significantly predict scores on all of the compulsivity facet traits in the female sample: perfectionism, $R^2 = .090$, $F(4, 246) = 6.09, p < .001$; orderliness, $R^2 = .072$, $F(4, 246) = 4.79, p = .001$; risk aversion, $R^2 = .328$, $F(4, 246) = 29.95, p < .001$; rigidity, $R^2 = .076$, $F(4, 246) = 5.05, p = .001$; and perseveration, $R^2 = .077$, $F(4, 246) = 5.10, p = .001$.

The standardized beta weights reported in Table 4 can be examined to determine which PSY-5 scale or scales contributed significantly to the prediction of the compulsivity facets. In both the male and female samples, the only statistically significant individual predictor of perfectionism was NEGE. Low DISC was the strongest predictor of risk aversion in both samples. However, in the male sample, INTR was nearly as strong a predictor of risk aversion. In the female sample, NEGE was a much weaker secondary predictor of risk aversion. Examination of the results from the female sample also indicated low INTR was a relatively weak but statistically significant predictor of orderliness, AGGR was the only significant predictor of rigidity, and the only individual predictor of perseveration was low INTR.
Table 4  
*Facets of Compulsivity Regressed onto the MMPI-2 PSY-5 Scales.*

<table>
<thead>
<tr>
<th>Scale</th>
<th>AGGR</th>
<th>DISC</th>
<th>NEGE</th>
<th>INTR</th>
<th>( R^2 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>MPS</td>
<td>.070/.045</td>
<td>-.095/- .093</td>
<td>.390*/.291*</td>
<td>.021/- .119</td>
<td>.179*/.090*</td>
</tr>
<tr>
<td>DIS-I Orderliness</td>
<td>—/—/.107</td>
<td>—/—/.165</td>
<td>—/—/.157</td>
<td>—/—/.179*</td>
<td>.015/.072*</td>
</tr>
<tr>
<td>RPS</td>
<td>.067/.004</td>
<td>-.444*/-.543*</td>
<td>-.028/.162*</td>
<td>.376*/.053</td>
<td>.384*/.328*</td>
</tr>
<tr>
<td>RAPH</td>
<td>—/—/.214*</td>
<td>—/—/.162</td>
<td>—/—/.106</td>
<td>—/—/.100</td>
<td>.078/.076*</td>
</tr>
<tr>
<td>PDQ</td>
<td>—/—/.155</td>
<td>—/—/.133</td>
<td>—/—/.060</td>
<td>—/—/.200*</td>
<td>.067/.077*</td>
</tr>
</tbody>
</table>

*Note.* Coefficients reported are standardized beta weights. Coefficients before the slash are for males, \( n = 157 \). Coefficients following the slash are for females, \( n = 251 \). The “em dash” (—) symbol indicates the beta weight was not reported because the regression equation was not statistically significant. Coefficients hypothesized to be significant predictors are underlined. MMPI-2 = Minnesota Multiphasic Personality Inventory-2; PSY-5 = Personality Psychopathology Five; AGGR = Aggressiveness; DISC = Disconstraint; NEGE = Negative Emotionality/Neuroticism; INTR = Introversion/Low Positive Emotionality; MPS = Multidimensional Personality Scale; DIS-I = Disinhibition Inventory; RPS = Risk Propensity Scale; RAPH = Rigid Attitudes regarding Personal Habits; PDQ = Perseverative Disposition Questionnaire.

* \( p < .01 \)
**PSY-5-r.** Table 5 presents the zero-order correlations between MMPI-2-RF PYS-5 scales and the compulsivity facets. These results were nearly identical to the correlations found for the MMPI-2 PSY-5 scales. In both samples, the negative relationships between DISC-r and risk aversion were large in magnitude while the relationships between NEGE-r and perfectionism were of medium strength. In the male sample only, a medium strength relationship was also identified for the association of risk aversion with INTR-r. No other correlations of at least medium effect size were found.

The results of 10 separate multiple linear regressions, where the MMPI-2-RF PSY-5-r scales were entered as predictor variables for each of the scales measuring facets of compulsivity indicated the PSY-5-r scales were able to significantly predict scores on each compulsivity facet trait with the exception of orderliness in the male sample, \( R^2 = .029, F(4, 152) = 1.15, p = .337 \). In the male sample, the PSY-5-r accounted for significant variance in score on perfectionism, \( R^2 = .181, F(4, 152) = 8.42, p < .001 \); risk aversion, \( R^2 = .398, F(4, 152) = 25.08, p < .001 \); rigidity, \( R^2 = .105, F(4, 152) = 4.45, p = .002 \); and perseverance, \( R^2 = .084, F(4, 152) = 3.49, p = .009 \). The results of regressing the compulsivity facet scales onto the PSY-5-r scales in the female sample were: perfectionism, \( R^2 = .134, F(4, 246) = 9.49, p < .001 \); orderliness, \( R^2 = .073, F(4, 246) = 4.84, p = .001 \); risk aversion, \( R^2 = .340, F(4, 246) = 31.68, p < .001 \); rigidity, \( R^2 = .112, F(4, 246) = 7.77, p < .001 \); and perseverance, \( R^2 = .065, F(4, 246) = 4.30, p = .002 \).
Table 5

Zero-Order Correlations between MMPI-2-RF PSY-5 Scales and Facets of Compulsivity.

<table>
<thead>
<tr>
<th>Scale</th>
<th>MPS</th>
<th>DIS-I Orderliness</th>
<th>RPS</th>
<th>RAPH</th>
<th>PDQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGGR-r</td>
<td>.01/.13</td>
<td>-.03/.14</td>
<td>-.26/.17</td>
<td>.05/.23*</td>
<td>.13/.18</td>
</tr>
<tr>
<td>DISC-r</td>
<td>-.11/-08</td>
<td>-.05/-11</td>
<td><em><em>-.55</em>/-.53</em></td>
<td>-.25/-11</td>
<td>-.07/.02</td>
</tr>
<tr>
<td>NEGE-r</td>
<td><em><em>.42</em>/.30</em></td>
<td>.15/.11</td>
<td>.25/.15</td>
<td>.15/.10</td>
<td>.09/.09</td>
</tr>
<tr>
<td>INTR-r</td>
<td>.11/-05</td>
<td>.12/-09</td>
<td><em><em>.44</em>/.25</em></td>
<td>.05/-09</td>
<td>-.19/-18</td>
</tr>
</tbody>
</table>

Note. Coefficients before the slash are for males, n = 157. Coefficients following the slash are for females, n = 251. Coefficients of |.30| or greater are in bold. Coefficients hypothesized to be significant are underlined. MMPI-2-RF = Minnesota Multiphasic Personality Inventory-2 Restructured Form; PSY-5 = Personality Psychopathology Five; MPS = Multidimensional Personality Scale; DIS-I = Disinhibition Inventory; RPS = Risk Propensity Scale; RAPH = Rigid Attitudes regarding Personal Habits; PDQ = Perseverative Disposition Questionnaire; AGGR-r = Aggressiveness-Revised; DISC = Disconstraint-Revised; NEGE = Negative Emotionality/Neuroticism-Revised; INTR = Introversion/Low Positive Emotionality-Revised.

* p < .001
Examination of the standardized beta weights, reported in Table 6, revealed the only statistically significant individual predictor of perfectionism in the male sample was NEGE-r. In the female sample, NEGE-r was the strongest predictor of perfectionism; however, low DISC-r was a weaker, but statistically significant secondary predictor. The strongest individual predictor of orderliness in the female sample was low DISC-r, although AGGR-r was a slightly weaker but still statistically significant predictor. Low DISC-r was also the strongest predictor of risk aversion in both samples. However, males and females had different secondary predictors of risk aversion, INTR-r and NEGE-r respectively. In the male sample, low DISC-r was the only statistically significant unique predictor of rigidity, while it was a slightly weaker secondary predictor in the female sample. AGGR-r was the strongest PSY-5-r individual predictor of rigidity for women in this study. Finally, none of the MMPI-2-RF PSY-5 scales were statistically significant individual predictors of perseveration in the female sample. Low INTR-r was the only unique predictor of perseveration found in the male sample.
### Table 6

**Facets of Compulsivity Regressed onto the MMPI-2-RF PSY-5 Scales.**

<table>
<thead>
<tr>
<th>Scale</th>
<th>AGGR-r</th>
<th>DISC-r</th>
<th>NEGE-r</th>
<th>INTR-r</th>
<th>$R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>MPS</td>
<td>.067/.142</td>
<td>-.079/-188*</td>
<td>.413*/.321*</td>
<td>-.010/-088</td>
<td>.181*/.134*</td>
</tr>
<tr>
<td>DIS-I</td>
<td>—/.186*</td>
<td>—/-219*</td>
<td>—/.126</td>
<td>—/-100</td>
<td>.029/.073*</td>
</tr>
<tr>
<td>Orderliness</td>
<td>RPS</td>
<td>.084/.068</td>
<td>-.485*/-.551*</td>
<td>.081/.185*</td>
<td>.299*/.124</td>
</tr>
<tr>
<td>RAPH</td>
<td>.192/.298*</td>
<td>-.313*/-.253*</td>
<td>.111/.108</td>
<td>.005/-067</td>
<td>.105*/.112*</td>
</tr>
<tr>
<td>PDQ</td>
<td>.103/.156</td>
<td>-.164/-096</td>
<td>.146/.103</td>
<td>-.243*/-.167</td>
<td>.084*/.065*</td>
</tr>
</tbody>
</table>

*Note.* Coefficients reported are standardized beta weights. Coefficients before the slash are for males, $n = 157$. Coefficients following the slash are for females, $n = 251$. The “em dash” (—) symbol indicates the beta weight was not reported because the regression equation was not statistically significant. Coefficients hypothesized to be significant predictors are underlined. MMPI-2-RF = Minnesota Multiphasic Personality Inventory-2 Restructured Form; PSY-5 = Personality Psychopathology Five; AGGR-r = Aggressiveness-Revised; PSYC-r = Psychoticism-Revised; DISC = Disconstraint-Revised; NEGE = Negative Emotionality/Neuroticism-Revised; INTR = Introversion/Low Positive Emotionality-Revised; MPS = Multidimensional Personality Scale; DIS-I = Disinhibition Inventory; RPS = Risk Propensity Scale; RAPH = Rigid Attitudes regarding Personal Habits; PDQ = Perseverative Disposition Questionnaire.

* $p < .01$
BFI. The zero-order correlations reported in Table 7 examined the association between the FFM, as measured by the BFI scales, and the compulsivity facets traits. Conscientiousness was strongly correlated with orderliness in both the male and female samples to the magnitude of a large effect size. In the male sample, several additional medium sized correlation coefficients were identified. Neuroticism was positively correlated with perfectionism and risk aversion. Risk aversion was negatively associated with Extraversion. Finally, Openness was inversely related to rigidity. No other correlations of at least medium effect size were found in either sample.

Multiple linear regressions were performed using each of the five compulsivity facet scales as the criterion variable with all five BFI scales entered simultaneously into the equation as predictor variables separately for both males and females. The results indicated the BFI was able to significantly predict scores among both men and women, respectively, on perfectionism, $R^2 = .152 F(5, 151) = 5.43, p < .001$; $R^2 = .156 F(5, 245) = 9.04, p < .001$; orderliness, $R^2 = .361 F(5, 151) = 17.10, p < .001$; $R^2 = .404 F(5, 245) = 33.20, p < .001$; risk aversion, $R^2 = .283 F(5, 151) = 11.92, p < .001$; $R^2 = .211 F(5, 245) = 13.14, p < .001$; and rigidity, $R^2 = .143 F(5, 151) = 5.06, p < .001$; $R^2 = .135 F(5, 245) = 7.67, p < .001$. The BFI failed to significantly predict scores on the perseveration scale in the male, $R^2 = .049 F(5, 151) = 1.56, p = .176$; and female samples, $R^2 = .026 F(5, 245) = 1.30, p = .265$. 
Table 7

Zero-Order Correlations between BFI Scales and Facets of Compulsivity.

<table>
<thead>
<tr>
<th>Scale</th>
<th>MPS</th>
<th>DIS-I Orderliness</th>
<th>RPS</th>
<th>RAPH</th>
<th>PDQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>.36*/.26*</td>
<td>.08/.06</td>
<td>.31*/.20</td>
<td>.13/.07</td>
<td>.08/.06</td>
</tr>
<tr>
<td>E</td>
<td>-.19/.03</td>
<td>-.07/.19</td>
<td>-.46*/-.26*</td>
<td>-.15/- .04</td>
<td>.13/.08</td>
</tr>
<tr>
<td>O</td>
<td>-.11/-.09</td>
<td>-.01/.02</td>
<td>-.24/.02</td>
<td>-.32*/-.22</td>
<td>.06/-.02</td>
</tr>
<tr>
<td>A</td>
<td>-.16/-.08</td>
<td>.17/.15</td>
<td>-.06/.13</td>
<td>-.02/- .08</td>
<td>.02/-.01</td>
</tr>
<tr>
<td>C</td>
<td>.03/.17</td>
<td>.56*/.57*</td>
<td>.13/.29*</td>
<td>.13/.23*</td>
<td>.09/.09</td>
</tr>
</tbody>
</table>

Note. Coefficients before the slash are for males, n = 157. Coefficients following the slash are for females, n = 251. Coefficients of |.30| or greater are in bold. Coefficients hypothesized to be significant are underlined. BFI = Big Five Inventory; MPS = Multidimensional Personality Scale; DIS-I = Disinhibition Inventory; RPS = Risk Propensity Scale; RAPH = Rigid Attitudes regarding Personal Habits; PDQ = Perseverative Disposition Questionnaire; N = Neuroticism; E = Extraversion; O = Openness; A = Agreeableness; C = Conscientiousness.

* p < .001
The standardized beta weights, reported in Table 8, revealed Neuroticism was a significant individual predictor of perfectionism in both the male and female samples. Conscientiousness was a secondary predictor of perfectionism but only in the female sample. The strongest individual predictor of orderliness was Conscientiousness among both men and women; however, Neuroticism and Extraversion were also statistically significant, albeit much weaker, predictors in the female sample only. Low Extraversion and Conscientiousness were also statistically significant predictors of risk aversion although low Extraversion was the stronger of the two for men and Conscientiousness was stronger among women. In addition, Neuroticism was a slightly weaker tertiary predictor of risk aversion in the female sample. Finally, low Openness was the only individual predictor of rigidity among males. In the female sample, Conscientiousness was the strongest unique predictor of rigidity while low Openness was a statistically significant secondary predictor.
Table 8

Facets of Compulsivity Regressed onto the BFI Scales.

<table>
<thead>
<tr>
<th>Scale</th>
<th>N</th>
<th>E</th>
<th>O</th>
<th>A</th>
<th>C</th>
<th>R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>MPS</td>
<td>.343*/.338*</td>
<td>-.039/.151</td>
<td>-.026/.113</td>
<td>-.086/- .081</td>
<td>.121/.262*</td>
<td>.152*/.156*</td>
</tr>
<tr>
<td>DIS-I Orderliness</td>
<td>.189/.245*</td>
<td>-.041/.225*</td>
<td>-.060/- .060</td>
<td>.106/- .008</td>
<td>.582*/.610*</td>
<td>.361*/.404*</td>
</tr>
<tr>
<td>RPS</td>
<td>.175/.220*</td>
<td>-.374*/-.242*</td>
<td>-.126/.016</td>
<td>.016/.135</td>
<td>.215*/.309*</td>
<td>.283*/.211*</td>
</tr>
<tr>
<td>RAPH</td>
<td>.092/.102</td>
<td>-.042/.021</td>
<td>-.322*/-.228*</td>
<td>.041/- .112</td>
<td>.183/.306*</td>
<td>.143*/.135*</td>
</tr>
<tr>
<td>PDQ</td>
<td>—/—</td>
<td>—/—</td>
<td>—/—</td>
<td>—/—</td>
<td>—/—</td>
<td>.049/.026</td>
</tr>
</tbody>
</table>

Note. Coefficients reported are standardized beta weights. Coefficients before the slash are for males, n = 157. Coefficients following the slash are for females, n = 251. The “em dash” (—) symbol indicates the beta weight was not reported because the regression equation was not statistically significant. Coefficients hypothesized to be significant predictors are underlined. BFI = Big Five Inventory; N = Neuroticism; E = Extraversion; O = Openness; A = Agreeableness; C = Conscientiousness; MPS = Multidimensional Personality Scale; DIS-I = Disinhibition Inventory; RPS = Risk Propensity Scale; RAPH = Rigid Attitudes regarding Personal Habits; PDQ = Perseverative Disposition Questionnaire.

* p < .01
Domain Level Analyses

Canonical correlation analyses (CCA) were conducted to examine the relationships of the compulsivity domain with the PSY-5 model and FFM of personality. Separate CCAs for males and females were not conducted because of concerns about power. In order to still account for gender differences, sex was entered into each CCA as a predictor variable along with the PSY-5 or FFM variables.

PSY-5. The first CCA was conducted using AGGR, DISC, NEGE, INTR, and sex as the predictors of the compulsivity facet scales measuring perfectionism, orderliness, risk aversion, rigidity, and perseveration. The overall model was statistically significant, Wilks’ $\lambda = .477$, $F(25, 1480.01) = 13.06, p < .001$. The overall squared canonical correlation ($R_c^2$) for the model was .523. The CCA indentified five functions with individual $R_c^2$ values of .396, .128, .060, .028, and .009, respectively. For the purposes of this study, it was determined that only the first two canonical functions would be interpreted since they each individually accounted for more than 10% of the shared variance between the predictor and criterion variable sets. In contrast, the last three functions combined did not account for 10% of the shared variance.

The structure coefficients for the first two functions of this CCA are reported in Figure 1. Coefficients associated with the first canonical function are reported to the left of the “slash” (/) symbol while coefficients associated with the second canonical function are reported after it. Structure coefficients represent the bivariate correlation between the individual observed variable and the latent variable created from the variable set for each
particular canonical function. Structure coefficients are analogous to loading scores from factor analysis. They are used to guide the interpretation of each canonical function.

Examination of the first canonical function’s structure coefficients for the compulsivity variables indicated the only meaningful contribution to this latent factor came from risk aversion. Low DISC was, by far, the strongest contributor to the PSY-5 latent variable; however, low AGGR, INTR, and sex (in the female direction) also loaded meaningfully onto this factor. The results from the second canonical function indicated perfectionism, perseveration, and rigidity, in that order, were important markers of the latent compulsivity trait. NEGE and AGGR were the observed variables that loaded most strongly onto the latent PSY-5 variable from the second canonical function.
Figure 1

Canonical Correlation Analysis of MMPI-2 Personality Psychopathology Five Scales and Compulsivity Facet Trait Scales.

Note. Coefficients associated with the first canonical function are reported to the left of the “slash” (/) symbol while coefficients associated with the second canonical function are reported to the right of it. MMPI-2 = Minnesota Multiphasic Personality Inventory-2; PSY-5 = Personality Psychopathology Five; AGGR = Aggressiveness; DISC = Disconstraint; NEGE = Negative Emotionality/Neuroticism; INTR = Introversion/Low Positive Emotionality.
**PSY-5-r.** Next, an analysis was conducted that entered the PSY-5-r scales and sex into the CCA equation as the observed predictors. Again, the overall model was statistically significant, Wilks’ $\lambda = .442, F(25, 1480.01) = 14.55, p < .001, R_c^2 = .558$. The CCA identified five functions with individual $R_c^2$ values of .427, .159, .056, .023, and .005, respectively. The decision was made to interpret only the first two canonical functions since they accounted for a much larger amount of variance than the final three functions. In fact, the second canonical function accounted for almost three times as much shared variance as the third did.

Examination of the structure coefficients (Figure 2) indicated nearly identical results to the first CCA, which used the MMPI-2 PSY-5 scales as the observed predictor variables. The compulsivity latent variable in the first canonical function was again marked exclusively by risk aversion while low DISC-r was the dominant contributor to the PSY-5 latent variable. INTR-r, sex (in the female direction), and NEGE-r also had weak loading values onto this factor. The results from the second canonical function indicated perfectionism, perseveration, and rigidity, again in that order, loaded on the latent compulsivity trait. AGGR-r, NEGE-r, and, to a lesser extent, low INTR-r were the observed variables that loaded most strongly onto the second canonical function’s latent PSY-5 variable.
Figure 2

*Canonical Correlation Analysis of MMPI-2-RF Personality Psychopathology Five Scales and Compulsivity Facet Trait Scales.*

![Diagram of canonical correlation analysis](image)

*Note.* Coefficients associated with the first canonical function are reported to the left of the “slash” (/) symbol while coefficients associated with the second canonical function are reported to the right of it. MMPI-2-RF = Minnesota Multiphasic Personality Inventory-2 Restructured Form; PSY-5-r = MMPI-2-RF Personality Psychopathology Five; AGGR-r = Aggressiveness-Revised; PSYC-r = Psychoticism-Revised; DISC = Disconstraint-Revised; NEGE = Negative Emotionality/Neuroticism-Revised; INTR = Introversion/Low Positive Emotionality-Revised.
Finally, an analysis was conducted that entered Neuroticism, Extraversion, Openness, Agreeableness, and Conscientiousness from the BFI along with sex into the CCA equation as the observed predictors. Again, the overall model was statistically significant, Wilks’ $\lambda = .369$, $F(30, 1590.00) = 15.02$, $p < .001$, $R_c^2 = .631$. The CCA indentified five functions with individual $R_c^2$ values of .452, .192, .107, .065, and .004, respectively. The decision was made to interpret the first three canonical functions since they accounted for more then 10% of the shared variance between the variable sets while the last two variables did not.

The structure coefficients for the first three canonical functions of this CCA are reported in Figure 3. The first canonical function’s compulsivity latent variable was marked by low orderliness and low risk aversion. Low Conscientiousness was the dominant contributor to the FFM latent variable for this function while low Neuroticism had a much weaker loading valuing. The results from the second canonical function indicated low risk aversion loaded strongly on this latent compulsivity trait while orderliness had a weaker but still meaningful loading value. The latent predictor variable was marked most strongly by Extraversioan. Low Neuroticism, Conscientiousness, and sex (in the male direction) had weaker structure coefficients. Perfectionism had the strongest relationship among the observed variables with the third canonical function’s latent compulsivity variable. The structure coefficient for rigidity was also interpretable for this function albeit at a much weaker magnitude. The FFM latent variable was marked by low Agreeableness, Neuroticism, low Openness, and sex (in the male direction).
Figure 3

Canonical Correlation Analysis of Big Five Inventory Scales and Compulsivity Facet Trait Scales.

Note. Coefficients associated with the first canonical function are reported to the left of the first “slash” (/) symbol. Coefficients associated with the second canonical function are reported to the right of the first “slash” (/) symbol and to the left of the second “slash” (/) symbol. Coefficients associated with the third canonical function are reported to the right of the second “slash” (/) symbol. FFM = Five Factor Model.
Discussion

The multivariate analyses conducted in this study did not generally support the DSM-5 Work Group’s initial proposal to consider compulsivity as a broad personality domain comprised of perfectionism, orderliness, perseveration, rigidity, and risk aversion facet traits. However, the data examined here indicated that these facet traits could be meaningfully captured by the personality constructs delineated in the PSY-5 and FFM.

What follows in this section of the paper is an examination of the results of first the univariate and then the multivariate analyses conducted in this study in terms of evaluating the degree of empirical support identified for the a priori hypotheses. Post-hoc explanations are offered for those hypotheses lacking in empirical support as well as for unanticipated empirical findings. Next, several limitations of this study are explicated. Then, implications of these data are considered, primarily focusing on how these data might support or question modifications to the DSM-5 recently proposed by the Work Group on Personality and Personality Disorders. Finally, a number of suggestions for future research expanding on the efforts of this study are reviewed.

Facet Level Hypotheses

**PSY-5.** Examination of the results of facet level analyses indicated strong support for the hypothesized negative relationship between DISC and risk aversion regardless of gender. The hypothesized relationship between NEGE and perfectionism was also supported in both male and female samples; although the magnitude of this finding was
not as strong as that found between DISC and risk. However, there was no empirical support for the hypothesized negative relationship between DISC and perfectionism. Finally, there was no empirical support for the hypothesized negative relationship between DISC and rigidity.

**PSY-5-r.** Again, support was found for the hypothesized negative relationship between DISC-r and risk aversion as well as the hypothesized relationship between NEGE-r and perfectionism across both samples. In the female sample, DISC-r was a statistically significant, negative secondary predictor for perfectionism in the regression analysis; however, the zero-order correlation between these constructs was not statistically significant and represented a small effect size. There was no support for the hypothesized negative association of DISC-r with perfectionism in the male sample. The analyses indicated mixed support for the hypothesized negative association between DISC-r and rigidity. DISC-r was a statistically significant, negative individual predictor of rigidity in the regression equations reported for both samples. However, in the female sample, DISC-r accounted for less unique variance in rigidity than was accounted for by AGGR-r. In addition, the bivariate correlations between rigidity and DISC-r were small in magnitude and not statistically significant in either sample.

There were several unanticipated findings regarding the relationship between the PSY-5 model of personality, as measured by scales on both the MMPI-2 and MMPI-2-RF, and the facet traits of compulsivity. For example, the failure to find empirical support for the hypothesized negative relationship between perfectionism and DISC was especially unexpected since it was in contrast to previous research (Rice & Stuart, 2010).
There are a number of possible explanations for this discrepancy. It is possible that the results of either the Rice and Stuart study or the present study were simply the result of statistical chance. Another possible explanation is that the two studies used different instruments to measure perfectionism. The instrument in the Rice and Stuart study, the APS-R, was designed to measure both adaptive and maladaptive perfectionism as distinct constructs. Although the MPS was also designed to measure facets of perfectionism, only the overall perfectionism score was used in analyses in this study. If the MPS overall score were heavily saturated by maladaptive perfectionism, as argued by Slaney et al. (2001), then perhaps DISC would not be as strongly associated with it. In support of this possible explanation, is the finding reported by Rice and Stuart that DISC was correlated with the adaptive but not the maladaptive perfectionism scale. In addition, Rice and Stuart found that DISC differentiated all perfectionists from non-perfectionists, but NEGE differentiated maladaptive from adaptive perfectionists indicating NEGE plays a stronger role than DISC when considering maladaptive perfectionism. A third possible explanation for the absence of an association between DISC and perfectionism may be characteristics of the study sample. For example, 256 participants were withheld from all analyses because of reasons like random responding or missing data. It seems plausible that personality characteristics like DISC or perfectionism may have differed systematically between those participants included in the study and those withheld from it. Thus, it is possible these results are a consequence of range restriction resulting from the disproportionate removal of participants with particular personality characteristics from the study. However, it is also worth noting that Rice and Stuart utilized a college
student sample and withheld participants from analyses using similar MMPI-2 validity scale criteria.

Explanations for why the hypothesized negative relationship between DISC and rigidity was not more clearly supported are less readily apparent. Of note, DISC-r seemed somewhat better able to account for rigidity than the MMPI-2’s DISC scale, at least in the male sample. Given this difference between the two scales designed to measure DISC, perhaps these results are a limitation of the instruments used to measure DISC rather than a weakness of the construct of DISC as defined by the PSY-5 model. Another possibility is that this hypothesis was based on theoretical understandings of DISC and rigidity rather than direct empirical evidence. This prediction was based primarily on rigidity being described as inflexibility despite circumstantial influences combined with the previous research that has established the strong relationship between DISC and impulsivity. However, if impulsivity and rigidity are only weakly correlated or not correlated at all, then this hypothesis would likely be wrong. A third possibility has to do with the instrument used to measure rigidity. The RAPH is an old instrument, and there is little information about the theoretical nature of the construct it was designed to measure. Perhaps rigidity, as defined and measured by the RAPH, is significantly different than the rigidity construct included as a facet of compulsivity by the DSM-5 Work Group.

In addition to failing to support several hypothesized relationships between the PSY-5 model and the facets of compulsivity, there were also several unexpected associations detected in this study. The strongest of these unexpected findings was the association, in the male sample, between INTR and risk aversion. Interestingly, although
this relationship wasn’t hypothesized for the PSY-5, a relationship between risk aversion and the FFM’s construct of Extraversion was hypothesized based on previous empirical research. Thus, this finding seems to be consistent with some of the research examining the association between risk taking behavior and the FFM’s conceptualization of introversion/extroversion (e.g. Dindo et al., 2009; Gullone & Moore, 2000; Nicholson et al., 2005; but for contradictory results see also Gute & Eshbaugh, 2008; Hong & Paunonen, 2009; and Trobst et al., 2002).

**BFI.** The results of this study supported the hypothesized relationship between Neuroticism and perfectionism. The hypothesized association between Conscientiousness and perfectionism was not supported in the male sample. There was modest support for this hypothesis in the female sample as Conscientiousness was a statistically significant secondary predictor in the regression equation; however, the bivariate correlation between these two constructs was small and not statistically significant. The results of this study provided strong support for the predicted relationship between Conscientiousness and orderliness across both samples. The results also supported the hypotheses that risk aversion would be negatively associated with Extraversion and positively associated with Conscientiousness; however, the relative importance of the FFM domains with risk aversion changed across samples. In the male sample, Extraversion was more strongly connected with risk aversion. In fact, the zero-order correlation between Extraversion and risk aversion was a medium-sized effect. The zero-order correlation between Conscientiousness and risk aversion was a small-sized effect that did not reach the level of statistical significance, although Conscientiousness was a
statistically significant secondary predictor of unique risk aversion variance in the regression equation. In contrast, the opposite was true in the female sample. Conscientiousness was more strongly associated with risk aversion than Extraversion was; however, the difference in the magnitude of these relationships was not as pronounced in the female sample. Finally, the results in the male sample supported the hypothesis that Openness would be significantly negatively related to rigidity. The results in the female sample were mixed. Openness was a statistically significant, negative predictor of rigidity in the regression equation; however, it was secondary to Conscientiousness, which was not hypothesized to be associated with rigidity at all. In addition, the bivariate correlation between Openness and rigidity represented a small-sized effect, which barely failed to reach the level of statistical significance set for these analyses.

There were several unanticipated findings regarding the relationship between the FFM of personality and the facet traits of compulsivity. The modest support of the hypothesized association between Conscientiousness and perfectionism in the female sample and the total lack of empirical support for this hypothesis in the male sample is perhaps most likely the result of using the MPS to measure perfectionism. As mentioned previously, Stumpf and Parker (2000) found Conscientiousness to be related to only one of the subscales used in calculating the overall perfectionism score on the MPS while Neuroticism was correlated with two of those subscales. The impact of using the MPS on the findings in this study are further supported when one considers Stumpf and Parker’s identification of Conscientiousness as being related to healthy perfectionism and
Neuroticism with unhealthy perfectionism in combination with Slaney et al.’s (2001) suggestion that the MPS was heavily saturated with maladaptive perfectionism.

Less clear is the unexpected strength of the association between Conscientiousness and rigidity in the female sample. Research was not available to guide the formation of hypotheses regarding the FFM and rigidity; however, given the theoretical understandings of the constructs, it seemed clear that Openness should account for most of the covariance between the FFM and rigidity. Indeed, in the male sample this was true. Perhaps this unexpected finding is the result of a true gender difference, or perhaps it is merely a sample specific result. Another possibility might be the use of the RAPH to measure rigidity since relatively little is known about its psychometric properties.

**Domain Level Hypotheses**

**PSY-5 model.** The results of the CCAs conducted using the MMPI-2 and MMPI-2-RF PSY-5 scales were nearly identical. Both models accounted for a meaningful amount of shared variance between the two sets of variable, although the model using the MMPI-2-RF’s PSY-5-r scales demonstrated slight superiority (it accounted for approximately 4% more shared variance). More importantly, the canonical functions identified by the two models were strikingly similar. As hypothesized, both models identified two interpretable canonical functions. However, the functions identified by both CCAs were only marginally supportive of the hypothesized multivariate relationship between compulsivity and the PSY-5 model. Consistent with the hypothesis, the PSY-5
latent predictor found in first canonical function was marked primarily by DISC, and the PSY-5 latent predictor variable from the second canonical function was characterized by NEGE.

In contrast to what was predicted, risk aversion was the only facet trait associated with the first canonical function, which was hypothesized to represent the domain of compulsivity. Perfectionism, rigidity, and perseveration loaded onto the latent criterion variable in the second canonical function as expected; however, the fact these facets did not also load onto the latent criterion variable in the first canonical function was unexpected. Also in contrast to the hypothesis, orderliness did not load meaningfully onto the latent criterion variable in either canonical function.

There are at least three explanations that can be posited in an attempt to understand why the hypothesized relationship between the PSY-5 model and compulsivity was not found. First, these results could be a consequence of limitations in measuring the PSY-5 constructs, the compulsivity construct, or both. Although the PSY-5 model was developed separate from the MMPI family of instruments, the scales used to measure it were created using the existing item pools of the MMPI-2/MMPI-2-RF. Thus, these scales are limited to the item content available in these item pools. Previous researchers have identified some limitations to the content validity of the PSY-5 scales that are likely a consequence of scale construction rather then limitations of the constructs themselves. For example, DISC does not seem to capture well certain aspects of the facet level components of the disinhibition-conscientiousness construct (Anderson et al., 2012; Egger, DeMay, Derksen, & van der Staak, 2003; Trull, Useda, Costa, &
McCrae, 1995; although for contradictory findings see Harkness et al. 1995). As mentioned previously, there are also some concerns that the instruments selected to measure perfectionism and rigidity, as well as the instrument created to measure perseveration, may not adequately match the facet trait constructs as defined by the Work Group and/or have adequate psychometric properties to accurately measure these constructs.

Second, it is possible that the theoretical constructs of the PSY-5 model, especially DISC, do not adequately encapsulate compulsivity. In fact, the proposed six domain trait structure for DSM-5 might suggest the PSY-5 model is not constructed in such a manner as to maximize measurement of compulsivity. The PSY-5 construct most likely to measure compulsivity, DISC, already matches well with another DSM-5 domain level trait, namely disinhibition (Anderson et al. 2012). A close examination of Harkness and McNulty’s (1994) original hierarchical analyses of DSM-III-R and MPQ markers of personality indicates that markers of compulsivity clustered together as a distinct factor at the seven-factor level. This “PSY-7” factor was characterized by markers of perfectionism, traditional morality, persistence/ambition, work ethic, reliability, and self-motivation. Following these personality markers to the five-factor level, most are absorbed into DISC although 29% become part of the PSYC domain. Perhaps this suggests serious consideration of developing a facet trait of DISC or even adding an additional domain trait to the PSY-5 to better encompass the construct of compulsivity.

It is also possible that the hypothesized results were not found because the construct of compulsivity itself, as defined by the Work Group, does not exist as a
distinct domain level personality trait. It is possible that perfectionism, orderliness, perseveration, rigidity, and risk aversion actually represent facets of another domain trait or traits (e.g. a constrained pole of disinhibition) rather than their own distinct compulsivity domain trait. In fact, recent changes to the DSM-5 proposed revisions made by the Personality and Personality Disorders Work Group reflect just this explanation (APA, 2012). The Work Group has eliminated compulsivity as a domain trait based on analyses conducted on data collected as part of the DSM-5 field trials (Krueger, Eaton, Derringer et al., 2011). Further changes to the proposal included moving perseveration to the negative affect domain; combining perfectionism, orderliness, and rigidity into a single facet trait named rigid perfectionism and placing it under the disinhibition domain; and combining risk aversion with recklessness (a facet trait originally proposed for inclusion on the disinhibition domain), naming the new facet trait risk taking, and placing it under the disinhibition domain (Krueger, Derringer, Markon, Watson, & Skodol, 2011).

Several other results of the multivariate analyses were surprising. Although it was not hypothesized, the finding across both CCAs that INTR and gender (i.e. females) loaded as secondary markers onto the latent predictor variable in the first canonical function is theoretically consistent given that risk aversion was the primary marker of the latent criterion variable. Unexpected and theoretically unexplained was the finding that AGGR was an important marker of the latent predictor variable in the second canonical function. This latent variable was hypothesized to be associated with the affective consequences of compulsivity, and indeed, NEGE was an important marker. Previous
research on the PSY-5 model has demonstrated AGGR to be related with emotional states, although it has been specifically associated with anger and not other affective states like depression and distress (Veltri et al., 2009; Veltri et al., 2007). However, Bagby et al. (2008) did report that AGGR was significantly correlated with symptoms of OCPD at nearly the same magnitude as NEGE.

**FFM.** The results of the CCA conducted using the BFI scales and gender as the predictor set indicated a meaningful amount of shared variance was accounted for between those variables and the compulsivity set of variables. In fact, the CCA including the FFM variables accounted for approximately 7% more shared variance than the model using the PSY-5-r scales, in contrast to what was predicted. In contrast to the CCAs using the PSY-5 model and the *a priori* hypothesis, the CCA including the FFM identified three interpretable canonical functions. These three canonical functions provided minimal support of the hypothesized multivariate relationship between compulsivity and the FFM. Consistent with the hypothesis, the FFM latent predictor found in first canonical function was marked primarily by low Conscientiousness, and the compulsivity latent criterion variable was characterized by a combination of low orderliness and low risk aversion. However, perfectionism, perseveration, and rigidity did not load significantly onto the latent criterion variable of this function as was hypothesized.

Furthermore, the results of the second canonical function were also inconsistent with predictions, as Extraversion was the strongest marker of the latent predictor variable while low risk aversion and orderliness loaded on the latent criterion variable. It was hypothesized that this canonical function would tap into an affective aspect of
compulsivity. Low Neuroticism was a secondary marker of the latent predictor variable, but orderliness, as it was theoretically defined by the Work Group, would seem to be the facet of compulsivity expected to have the least association with affective experience.

The results of the third canonical function were also unexpected both in terms of being strong enough for interpretation and in terms of the multivariate relationship it identified. The latent predictor variable was most strongly marked by low Agreeableness, although Neuroticism and low Openness were only slightly weaker secondary markers. Perfectionism loaded very strongly on the latent criterion variable while rigidity also did to a lesser extent. Neuroticism and low Openness with perfectionism and rigidity makes sense when the univariate hypotheses are reconsidered; however, low Agreeableness loading on the latent predictor variable at all is entirely unexpected and difficult to explain.

The explanations for the failure to support the hypothesized multivariate relationship between the FFM and the compulsivity domain trait are similar to those explanations offered for the PSY-5 model. One possible explanation for the failure to support the hypothesized relationships between the FFM and compulsivity is a limitation of the FFM itself. In fact, Krueger, Eaton, Clark et al. (2011) provide an alternative explanation for the failure of the FFM to adequately measure compulsivity when they suggest that the trait hierarchical structure for normal and pathological personality may be somewhat disjointed. They observe that only the domains of negative and positive affect map together well across normal and abnormal models of personality. They argue that beyond those two domains, the connection between normal and abnormal models of
personality is less congruent. Indeed, they highlight a mismatch between Conscientiousness and compulsivity as one important example of the different orientation of the normal and pathological trait hierarchies.

Of course, the failure to support the hypothesized relationships between compulsivity and the FFM could be the result of problems with the construct of compulsivity. As described above, the Work Group has come to the conclusion that compulsivity does not represent a distinct domain-level personality trait. As such, it seems probable that hypotheses developed on the theoretical understanding of compulsivity as a distinct domain trait will fail to be supported empirically.

Limitations

There are two major limitations to the generalizability of the results of this study. The first limitation is the use of an undergraduate student sample. The Work Group (APA, 2010) defined compulsivity and its facet traits for the explicit purpose of considering them for inclusion in the DSM-5. Thus, these constructs were defined to tap into pathological manifestations of personality. Therefore, a clinical sample would be better suited to investigate these personality constructs. However, there is evidence to suggest the use of an undergraduate sample in studying personality psychopathology can still be useful when utilizing dimensional models (O’Connor & Dyce, 1998). Also, epidemiological research has suggested the occurrence of personality pathology in undergraduate samples is not insignificant (Lenzenweger, 2008).

The second major limitation to the generalizability of these results is the sole reliance on the use of self-report inventories. Critics of the reliance on self-report for
examining personality have argued important information is distorted and/or missed when asking participants to provide information about their own personality (e.g. Bornstein, 2003; Bornstein, 2011; Huprich, 2011). Still, approximately 80% of personality disorder research conducted between 1991 and 2000 relied exclusively on the use of self-report (Bornstein, 2003). Furthermore, the Work Group seems to be making important decisions about the clinical assessment of personality disorder in DMS-5 (Morey et al., 2011) as well as the trait structure of pathological personality (Krueger, Derringer et al., 2011) based largely on empirical analyses heavily reliant upon the use of self-report inventories.

**Implications**

Keeping the above identified limitations in mind, there are several important implications of this study. Perhaps most importantly, the results of this study support the Work Group’s recent decision to remove compulsivity as a domain trait from consideration for DSM-5. The multivariate analyses conducted in this study did not support a clustering of perfectionism, perseveration, orderliness, rigidity, and risk aversion under a single, common domain. Although other types of data and analyses will be needed to more rigorously reject the hypothesized compulsivity domain, the data gathered here provide additional reason for skepticism.

The results of this study also support another recent Work Group decision, namely to place the risk aversion facet under the disinhibition domain. The results of the analyses using the PSY-5 model indicated risk aversion is strongly associated with DISC (inversely) in both male and female samples. This decision has also been reported in
other recent empirical investigations, as Anderson et al. (2012) found DISC was strongly correlated with the DSM-5 domain trait of disinhibition as well as the newly revised facet trait of risk taking. The FFM also adequately tapped into risk aversion in this study; however, Extraversion and Conscientiousness were nearly equivalently related to it. Rather than interpreting these data as suggesting that risk aversion should be considered for placement within the detachment domain in the DSM-5 personality hierarchy, one might consider these data as an additional indication that Conscientiousness and disinhibition are one place where the normal and abnormal personality trait hierarchies don’t map directly on to one another (Krueger, Eaton, Clark et al., 2011). Thus, these findings suggest that the PSY-5 model might be a more easily interpretable and useful measure of the DSM-5 risk taking facet than the FFM.

Several recent changes made by the Work Group (APA, 2012) are called into question by results of this study. For example, the decision to combine perfectionism with rigidity and orderliness into a single facet called rigid perfectionism is not supported. Although all three CCAs conducted suggest perfectionism and rigidity might be fruitfully combined, orderliness did not load meaningfully onto the same canonical function in any case. In addition, the Work Group determination to place the rigid perfectionism facet under the disinhibition domain is not supported by the results of this study. Instead, when examining both the multivariate and univariate analyses it seems indicated that perfectionism/rigidity might probably be best considered for inclusion with the negative affect domain. Finally, there was no evidence found to support the decision to place the perseveration facet trait under the negative affect domain. Caution should be
taken in weighing the importance of this contradictory evidence against the decisions of the Work Group as the results reported here, as previously suggested, could be a consequence of the instruments used in this study rather than the actual relationship between these constructs as defined by the Work Group; however, it would perhaps seem to be the most prudent approach to consider these decisions open empirical questions in light of these data.

Another important finding of this study is the clear superiority of the FFM in accounting for orderliness. Review of Harkness and McNulty’s (1994) original developmental article suggest the PSY-5’s insensitivity to orderliness may be the result of the instruments used to measure the constructs rather than the theory itself. Thus, the data reported in this study suggest the PSY-5 construct of DISC might benefit from improved content and construct validity if measured using an instrument designed to measure the full breadth of the construct as originally described by Harkness and McNulty.

Finally, results of the multivariate analyses suggested gender played a significant role in accounting for common variance between the two sets of variables more often than not. Thus, it appears gender may impact the structural relationship between some facets and/or domains of personality. Close examination of the results suggests that this might be especially true in regards to secondary relationships between variables. These results also could suggest that gender acts as a moderator of the relationships between traits in the personality hierarchy.
Future Directions

There are a number of potentially fruitful paths of future inquiry that could be undertaken, either springing directly from this study or examining the broader domain of personality and psychopathology from which this study was developed. One possible avenue of future research involves the measurement of personality. Additional examination of the instruments used to measure the constructs identified in this study is certainly warranted. For example, a measure of perseveration (i.e. maladaptive persistence) was not found to exist in the published literature so an attempt was made to create one for the purposes of this study. Additional efforts to develop, refine, and examine the psychometric properties of a self-report measure of perseveration are certainly warranted.

Another measurement issue relates to the abundance of instruments measuring perfectionism. Based on examining the results of this study in the larger context of the existing research literature, it appears that perfectionism is likely related to both negative affect and constraint. It seems plausible that the domain onto which perfectionism loads is a consequence of the instrument used to measure it. Alternatively, it could be that adaptive perfectionism belongs to one personality domain while maladaptive perfectionism belongs to another. It also possible that both of these hypotheses are true. Only additional examination of the various instruments used to measure perfectionism will resolve this question.

The results of this study also raise questions regarding the content validity of the PSY-5 scales in their present state. It seems possible that these scales truncate to some
degree the PSY-5 constructs as they were originally defined by Harkness and McNulty (1994) as a consequence of their reliance on the static item pool of the MMPI-2. Future research into developing other instruments measuring the full range of the PSY-5 might prove especially useful now given their striking congruence to the five personality domain traits proposed for the DSM-5 (APA, 2012). Extending the PSY-5 model by developing facet traits based on Harkness and McNulty’s original theoretical explication might also be possible using a newly developed instrument.

Other questions raised by this study include the impact of gender as a moderator of the personality pathology hierarchy. Evidence from this study suggested that gender might not be important when two constructs are strongly associated, but it might play a role in terms of weaker relationships. For example, the relationship between risk aversion/risk propensity and extraversion/introversion might be moderated by gender.

The results of this study also provided empirical evidence suggesting some support for the determination made by the Work Group to remove compulsivity as a domain trait from the proposed hierarchy for DSM-5. However, the data from this study are not a strong test of this question. Therefore, a future study could use another analytic technique, such as confirmatory factor analysis, to test the proposition of whether compulsivity is a distinct domain trait or the polar opposite of disinhibition.

The question of compulsivity’s existence as a discrete domain level personality trait bridges the gap between future research springing directly from this study and those research endeavors examining the associated context in which this study was situated. For example, the Work Group has tentatively proposed a trait hierarchy for maladaptive
personality (APA, 2012); however, members of the Work Group have indicated that their belief the facet structure may likely require modification (e.g. Krueger, Derringer et al., 2011; Krueger, Eaton, Clark et al. 2011). Modification at the facet level could involve reconfiguring the domain(s) onto which an individual facet loads as well as the addition, deletion, or further definition of any given facet trait. Therefore, close empirical examination of the composition and organization of maladaptive personality at the facet level is certainly warranted.

Finally, Krueger, Eaton, Derringer et al. (2011) claim that research into the empirical structure of psychopathology might suggest that a metastructure of psychopathology could be used to organize DSM-5. They identify three “metaclusters” of psychiatric disorders, namely internalizing disorders, externalizing disorders, and psychotic disorders. Research has also linked personality traits to these disorder spectra (e.g. Griffith et al. 2010; Krueger et al., 2002). Therefore, Krueger, Eaton, Derringer et al. (2011) suggest that future research should examine where personality pathology fits in this DSM-5 metastructure. There are many different possible relationships between personality and psychopathology (Widiger & Smith, 2008). For example, does personality pathology form a distinct, perhaps parallel structure to other forms of psychopathology? Does personality pathology exist on a spectrum with other forms of psychopathology perhaps even sharing common etiological factors (Clark, 2005), thus making irrelevant the line so carefully drawn between the two drawn in DSM-III? Is personality actually a causal factor of psychopathology and vice versa? These larger questions about the structure and relationship of personality and psychopathology are
somewhat daunting as they are open to much future theory building and testing, but perhaps in this direction lay the greatest future rewards for dogged empirical pursuit.

**Conclusion**

The purpose of this study was to examine to what degree the personality domain trait of compulsivity and its associated facet traits were encompassed by existing models of personality. The results of the study did not support the theory that perfectionism, orderliness, perseveration, rigidity, and risk aversion were facets of the broad personality domain of compulsivity. However, there was evidence these facet traits could be tapped into with varying degrees of success by the PSY-5 model and FFM of personality. The PSY-5 was better able than the FFM to account for risk aversion while the opposite was true for orderliness. Further research into the domain and facet traits of maladaptive personality will be needed with the implementation of a dimensional model for the assessment of personality disorders in DSM-5. This area of research has the potential to advance not only the understanding of the structure and treatment of personality pathology, but may eventually influence the broader conceptualization and organization of all psychopathology as well as provide a stronger understanding of etiological factors and targets for intervention.
References


Appendix

PDQ

Listed below are a series of statements. Carefully read each statement and decide how well it describes you.

1. If I struggle to complete a task it is probably because I haven’t tried hard enough or I haven’t practiced long enough.
   Not at all like me | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Very much like me

2. Once I start something I stick with it no matter how often I fail.
   Not at all like me | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Very much like me

3. I have been reprimanded by a supervisor, teacher, or other authority figure for “wasting too much time” when I was faced with a challenge that I was unable to solve.
   Not at all like me | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Very much like me

4. When I run across a problem, I have a tendency to try the same solution over and over again even if it doesn’t seem to work.
   Not at all like me | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Very much like me

5. Even if I have tried and failed at something 100 times, I think to myself “This time I will succeed.”
   Not at all like me | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Very much like me

6. I have been told before by others that I need to “give up” or “move on” after they found out how much I was struggling to complete a task.
   Not at all like me | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Very much like me

7. I’m the type of person who will keep trying even when it seems as though I’m not making any progress.
   Not at all like me | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Very much like me

8. There have been times when I became so focused on completing a certain task that it has caused me problems (e.g. conflict with others, problems at school/work).
   Not at all like me | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Very much like me

9. When faced with a situation that others believe is impossible, I think to myself, “I just need to try harder.”
   Not at all like me | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Very much like me